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BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 129

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USSR REPORT

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AGRICULTURAL MICROBIOLOGY

USE OF SILAGE LEAVEN FOR FODDER IMPROVEMENT URGED

Leningrad LENINGRADSKAYA PRAVDA in Russian 7 Aug 79 p 2

/Article by N. Fedulina, candidate of biological sciences, senior scientific worker at the All-Union Scientific Research Institute of Agricultural Microbiology: "Efficiently and Profitably"/

/Text/ The discussion "What fodder is needed and how should it be prepared?" began on the pages of LENINGRADSKAYA PRAVDA during the first days of June. The participants in the talk at the "round rable" raised a number of important and urgent problems connected with the further development of fodder production.

These problems evoked the interest of a wide circle of agricultural workers. Today we give the floor to a scientist.

The development of livestock breeding requires not only an increase in the amount of fodder, but, what is most important, improvement in its quality. Continuing the discussion, I would like to touch upon another important problem--the use of preservatives. These preparations help to preserve the food value of fodder. In particular, they include the silage leaven.

This leaven was recommended for use a long time ago, but it has not found extensive application in our oblast. Numerous experiments with this preservative have been conducted at our institute for many years. Now one can state with full responsibility that the silage leaven is a highly efficient means of improving the quality of preserved fodder.

The leaven is a culture of useful lactic acid bacteria especially selected for improving the quality of silage. When fodder is prepared correctly, lactic acid fermentation in the mass placed for storage is intensified and auxiliary fermentative processes are suppressed. Owing to this, nutrient losses are reduced in silage. High-quality fodder is obtained.

I shall discuss this at greater length. On the green mass placed for storage there are lactic acid and putrefactive bacteria. The former possess the property of retaining nutrients in fodder, while the latter, conversely, decompose it. All this would not matter if there were equal amounts of these bacteria. However, the whole point is that putrefactive bacteria propagate much more rapidly than lactic acid bacteria. Then fodder loses nutrients and vitamins. More simply, it becomes unsuitable for feeding. Is there a way of preserving it? Yes. It is only necessary to create conditions under which lactic acid bacteria would develop more rapidly than their opponents.

This can be done by carefully observing the rules of preparing and storing the green mass for silage. However, in order not to make mistakes, it is best to use preservatives--either chemical or biological, like the silage leaven. It stimulates the growth of lactic acid bacteria, which quickly propagate, neutralize their opponents and do not make it possible for them to manifest a harmful effect.

This is the essence of the processes occurring when the silage leaven is used. However, it has another positive property. Lactic acid bacteria neutralize some organic acids, which lower the assimilability of fodder. Thus, as a result of the use of this leaven, livestock breeders obtain truly valuable fodder. When 1 ton of a silage mass treated with the leaven is fed, the cost of the output obtained from animals is lowered by 30 kopecks.

Thus, the biological preservative has positive qualities. However, why, in practice, is it used in a limited way? Perhaps leaven production is so complicated that it can be used only for laboratory analyses? No. The silage leaven is now made according to techniques developed by our institute in more than 60 veterinary and bacteriological laboratories, biological shops and plants in the country forming part of the system of the Main Administration of the Microbiological Industry.

In our oblast the silage leaven is produced at the Kolpino Experimental Production Enterprise of the All-Union Scientific Research Institute of Agricultural Microbiology. Its capacity makes it possible to provide all the oblast farms with the necessary amount of the preservative.

The techniques of treating the silage mass with the leaven are not complicated. The preservative is bottled at the enterprise. One bottle is quite sufficient to treat 16 tons of the mass.

Nevertheless, on the whole, this year the enterprise has received orders from rayon Sel'khoztekhnika associations for only 10 tons of the leaven. As before, the leaven will be used on sovkhozes in Lodeynopol'skiy and Lomonosovskiy rayons. Even there the scale of application of the preservative is by no means what it could have been. Often I had occasion to talk with managers and specialist on the oblast sovkhozes. All of them are well aware of the advantages of this leaven. But no one can explain the reason for the limited use of the biological preservative. Most often they shrug their shoulders in a puzzled manner: "We don't know why."

But, most likely, managers and specialists in their daily concern for fodder do not want to burden themselves with unnecessary troubles. As a result, fodder for collective livestock is often of a very low quality.

Nor must we fail to dwell on the role of specialists of rayon administrations of agriculture and of leading farms of sovkhoz associations. They should be the first to put everything that is new and advanced into the practice of agricultural workers. One cannot say that nothing is done in this area. Seminars are organized, recommendations of scientists on the use of preservatives are studied, but for some reason the matter does not move further than that.

In connection with this I would like to say that party organizations of sovkhozes should not keep aloof from such a big and important a problem as the fight for a high quality of fodder. Apparently, they should take this important matter under their daily control and see to it that preservatives receive a permanent "pass" on every farm in the oblast.

Hay is now being harvested on the fields of the oblast sovkhozes. Farmers are fighting for providing farms and livestock breeding complexes with a reliable fodder reserve. There should be no trifles in this very important work. But sometimes preservatives are considered as such. The development of fodder production as a sector requires a serious approach to this urgent problem. Those who prepare fodder must utilize both advanced experience and scientific achievements. Only under this condition will success be achieved.

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MARINE MAMMALS

IN THE WORLD OF INTEREST: DOLPHINS HAVE A PREMIERE

Minsk SEL'SKAYA GAZETA in Russian 16 Oct 79 p 4

[Article by Bel'skiy, S., TASS Correspondent]

[Text] In the Batumi marina for dolphins there is a premiere. A trio appears--a man and two dolphins. They move headlong along the pool. The trainer Georgiy Iosava has achieved synchronous speed of movement. This is one of the numbers of the new demonstration program.

A trick such as the following amazes onlookers: on command, three dolphins simultaneously leap out onto a platform. The complication is the fact that the instinct of self-preservation forces ocean mammals to avoid shallow water, not to mention dry land. And, see, dolphins accomplish paired leaps through hoops hung high over the water. One trick follows another. The scientific coworkers T. Tserodze, G. Gedzhadze and V. Karabashyan came forward, as enthusiasts, for studying and teaching these ocean mammals in the marina for dolphins of the Georgian Department of the All-Union Scientific Research Institute of Salt Water Fishery and Oceanography. Trainers G. Iosava and S. Suglobov, with fascination, fulfill their obligations as "tutors" of dolphins. These people are developing in their pupils more and more complicated skills.

Today the Black Sea dolphins--there are 12 of them here--clearly distinguish and execute more than 30 commands. At a motion of the palm they leap out of the water to a height of up to 3 meters. A circular motion of the hand and a dolphin standing on its tail turns around its axis. At commands, animals tow a boat with a person on board, play "basketball" and "volleyball."

"However, we cannot claim that dolphins possess a phenomenal memory" says the head of the Department of Sea Mammals of the institute, Z. Bolkvadze. "After several months the dolphin 'remembers,' for example, that he has to catch the ball, but 'forgets' that he should throw it in the basket. We tried to teach dolphins to first fetch a ball thrown in the water and then, a ring. The dolphins did not succeed in understanding that they should put the ring on their nose and not carry it, like a ball. We changed the method of instruction: first the ring, then the ball, and the dolphins successfully coped with the problem."

In teaching dolphins, the idea attracts us of using them in the national economy. We try to shed light on whether these sea animals can reveal schools of fish, detain them until the arrival of a fishing vessel, or drive them into nets.

Commands and gestures for these goals would not be suitable, since they can be given only in a close proximity. In the open sea it is necessary to use an acoustic signalling apparatus. A dolphin hears ultrasounds well. Scientists are facing the task of understanding how animals distinguish these signals, how many commands they can remember. Teaching dolphins to execute acoustic commands is the next stage of work of the collective of the marina for dolphins.

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MARINE MAMMALS

DOLPHINS: MYTHS AND REALITY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Sep 79 p 4

[Article by Zubkov, V. and Namtalashvili, G., Special Correspondents of the Newspaper]

[Text] Aristotle wrote that "a dolphin possesses hearing, but doesn't have ears." In actuality, he does not have auricular helices, which are not needed in the water. Sound is transferred freely from the denseness of water to the soft tissues and skeleton, and then arrives at the internal ear.

According to the words of the Director of the Georgian Department of the All-Union Scientific Research Institute of Salt Water Fishery and Oceanography, L. Tsuladze, dolphins hear sounds in a range from 16 hertz to 280 kilohertz while in man, as a rule, the threshold of audibility does not extend further than 20 kilohertz. And hearing in dolphins is very acute.

With their unique vision these animals have stumped research scientists. It is not enough that dolphins see excellently both in the water and in the air. No one can yet clearly explain how they succeed, located under the water, to clearly see the motions of their trainer.

According to the testimony of L. Tsuladze, a dolphin in a marina for dolphins leapt out of the water to a great height and broke a cigarette which was in the mouth of its trainer. At the same time it did not once touch him.

However, vision, which is so necessary on land, is of little use in the water. Even more so this applies to rivers full of murky sediment. Not accidentally the dolphin "Susu," an inhabitant of the River Ind in Pakistan, is, generally speaking, blind.

In one marina for dolphins they performed the following experiment. On a trained dolphin they placed over the eyes tightly adhering rubber patches. Then they threw a vitamin capsule into the pool--a small oblong object with the length of about a centimeter. The dolphin easily found it in any spot in the pool. Neither vision nor hearing were aids in this case. What was then? In this case natural sonar was working, the echo sonar set of the dolphin.

With the help of echo sounding "clicks," dolphins probe, as it were, the surrounding sea. Analyzing the returning reflected signal, they determine the distance to the objects, the latter's forms and dimensions, and also the direction and speed of their movement with a high degree of precision. But this is not all. The ability of dolphins to differentiate materials at a distance and in particular to distinguish, at the same time, brass from duralumin amazed scientists.

In a word, these mammals possess such a perfect echo sonar set, that engineers would willingly apply it in their technology.

However, scientists still don't completely understand how this organ acts.

Very recently it seemed that only a little bit more was required, and we would arrange a dialogue with dolphins. Journalists and several scientists maintained this belief. In general, dolphins are rather "talkative": they let out a multitude of sounds: they yelp, whistle, squeak, squeal, mew and chirr. An adult aphaline (Tursiops truncatus), living in our Black Sea, lets out 32 characteristic signals, and the white-flanked dolphin a few less. These abilities, together with a rather voluminous brain, suggested the idea at one time to several scientists of possible auditory contact with the aquatic mammals.

Now, no one thinks about this any more but attempts continue to be made to understand the principles of communication of these animals. We are talking here, of course, not about full-blown conversation, but about a system of conventional signals.

One may consider proven that dolphins communicate with the help of whistling. But in which situations they utter them remains a riddle.

The head of the Department of Ocean Mammals of the Georgian Branch of the All-Union Scientific Research Institute of Salt Water Fisheries, Z. Bolkvadze, relates that while alone a dolphin behaved rather quietly. But as soon as they lowered a mirror into the water in which he could see himself, the animal became significantly more "conversational."

Researchers think that for dolphins there exists a rather complex system of communication. In the Black Sea observations were carried out by Soviet scientists on two groups of white grampuses separated by almost a kilometer. When they disturbed one group, the other immediately, almost without any visible cause, turned tail and ran.

With the aim of tracing the reaction of dolphins to a clearly-presented situation, a tentative experiment was staged. The investigators set up aluminium pipes at intervals of 15 meters across the channel chosen by dolphins. Soon a school of dolphins appeared. Approaching to a distance of 350 meters from the barrier, the animals unexpectedly turned to shallow water, although their behavior remained externally calm. Soon a scout separated from the group. He swam along the fence, examining it with the help of his echo sonar set and then returned to his kinsmen awaiting him. Whistles were heard. After a short lively "conversation" two more scouts examined the barrier. Soon the whole school left the shallow water and calmly passed the obstacle.

In this experiment, in the opinion of specialists, the ability of dolphins to have elementary communication, and no more, was revealed. But with confidence we can confirm that the cause of the lively whistling back and forth was the unexpected obstacles.

Significantly greater success awaited specialists who studied the possibilities of dolphins' using auditory commands transferred under the water. At a command consisting of an artificial word without an analog in human language, the animals leapt out of the water, batted a ball with their flippers, uttered the necessary signals, and performed a multitude of other tricks. And what is no less important, it was proven that a dolphin willingly reacts to the sound of a ball dropped in the water. This means that it may perceive a command: "return home." And this already opens the path for the use of dolphins to perform useful work in the open ocean.

CSO: 1840

MEDICINE

SINGLE COMBAT WITH THE BLUNT NOSED VIPER

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Aug 79 p 4

[Article by Melikov, D. and Popov, O., Special Correspondents of the Newspaper]

[Text] Here, in the second department of the Azerbaijanskiy Herpetologic Laboratory for the Production of Snake Venom, there are 650 snakes. Only two people conduct the extraction of venom--herpetologist El'dar Khanlarov and his younger colleague, necropsy assistant Natig Mamedov. And, even if this procedure drags out to 3 days, it still means that each of them in a day must win more than 100 single combats.

Yuzasif Medzhirov, fulfilling the responsibilities of Director of the laboratory, agrees, "Somebody has to do this work. Snake venom is dearly needed by people. Actually, it is a paradox. It conceals death in itself and it brings salvation. How many of the most valuable medicines are made of it! Viprotoks, viprosal, for example, cure rheumatism, salt deposits; lebetoks is an irreplaceable preparation for restoring of blood coagulation. There are a multitude of other medicines which can be obtained only from snake venom. And 1 gram of it from our Transcaucasian blunt-nosed viper costs 160 rubles. See what a valuable substance it is! And it has to be obtained by this quite dangerous method. In our laboratory, this section is the smallest. There are two others, which are larger, on the Shakhovaya Spit and in the village Zyr'. In all, in the laboratory, there are about 3,200 blunt-nosed vipers. It is true that for the present our rooms are crowded; there are no well-equipped terrariums in which it would be possible both to raise snakes and to work comfortably. But the Republic Committee for the Protection of Nature already has at hand an interesting project for a new laboratory. So we do have prospects."

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CSO: 1840

ACCORDING TO NATURE'S PATENT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Oct 79 p 4

[Article by Smirnov, V., TASS correspondent]

[Text] An analog of live bone tissue has been created by scientists of the Institute of Polymer Mechanics of the Latvian SSR Academy of Sciences.

"Extensive damage of bone tissue quite frequently compels surgeons to take extreme measures--amputation of extremities--" the director of a laboratory of the institute, P. Knets, related to TASS correspondent V. Smirnov. "In order to avoid that, we proposed the bone substance analog, made of polymer material, reinforced with fibers of organic compounds and metal. This method has been deemed an invention and has been patented in many countries."

Specialists in mechanics and electronic equipment, physicians, biologists and mathematicians are working in close collaboration in the laboratory. Recently, new data have been obtained here on the change in mechanical properties of the vascular system of man as a function of age. It was established that when there is a partial or complete thrombosis of one or several arteries of the heart their reconstruction is possible. For this purpose we propose construction of collateral paths for the blood flow.

The young scientific trend, born at the junction of various branches of knowledge, is developing at a rapid tempo. Within the facilities of the laboratory at Riga, plans have been made to create an Academy Institute of Biomechanics (Riga).

CSO: 1840

ADVANCED BIOTECHNOLOGY

HEART VALVE PROSTHESIS NO LONGER CONFINED TO MAJOR CARDIOLOGICAL CENTERS

Moscow TRUD in Russian 13 Sep 79 p 5

[Article by Ye. Meshalkin, Director of the Scientific Research Institute of Cardiovascular Pathology, Ministry of Health RSFSR, Lenin prize laureate, academician of the USSR Academy of Medical Sciences: "Restoring Health to the Heart"]

[Excerpt] Heart valves, damaged by disease, can be replaced by new artificial ones.

Solving this task turned out to be within the capability of the large specialized surgical centers set up at the All-Union Scientific Research Institute of Clinical and Experimental Surgery and the Scientific Research Institute of Organ and Tissue Transplants of the USSR Ministry of Health, at the Institute of Cardio-Vascular Surgery of the USSR Academy of Medical Sciences, at the Cardio-Vascular Clinic at the Kiev Institute of Tuberculosis and Heart Surgery, at the Cardio-Vascular Surgery Clinic at Vil'nyus University, and at the surgery clinic at the Gor'kiy Medical Institute Hospital.

The various heart valve prostheses and methods, proposed and approved by soviet cardiologists, have long since ceased to be the monopoly of major clinics. These mthods are used very widely at such cardiological centers as Novosibirsk, Riga, Gor'kiy, Kemerovo, Vil'nyus, Blagoveshchensk, Tallin, Yerevan, Tartu, Frunze and Kaunas.

Now patients with heart failure are by means sufferers who are destined to become invalids. Valve prosthesis restores health to the heart; and for the patient, the capability for work and happiness.

A miracle? Yes, a miracle. But only an ordinary, habitual one. But, initially, this miracle was created by the hands of the soviet cardiologists and engineers: N. M. Amosov, B. P. Zverev, B. A. Korolev, A. Martsinkyavichus, Yu. A. Perimov, G. F. Romanov, G. M. Solov'yev, G. I. Tsukerman and V. I. Shumakov. This outstanding achievement in science belongs to them--the development and creation of domestically designed and produced artifical heart valves, and, the implementation of the complex heart surgery into clinical practice. Their work has been rightfully proposed for the USSR State Prize Competition.

CSO: 1840-P

INSTRUMENTS AND EQUIPMENT

HEALTH SERVICE: NEW CARDIOLOGY INSTRUMENTS

Vilnius SOVETSKAYA LITVA in Russian 26 Sep 79 p 4

[Article by Yermolayeva, I., Press Agency "Novosti" and Yemev'yanov, V. K., editor]

[Text] Arrhythmia means that the rhythm of the heart is disturbed. It beats too rapidly, too slowly or chaotically. Obviously, some kind of changes have occurred in its main mechanism, the heart muscle. But exactly what kind of changes? How dangerous is this? Physicians are trying to find an answer to these questions by carefully studying the cardiogram. And the answer is not always correct.

A new instrument, a rhythmocardioscope, relieves the physicians from the labor consuming process. Here there is nothing to measure. A glance of an experienced cardiologist at the screen of the instrument is sufficient to determine the variety of the arrhythmia. The length of one session of inspection may last up to a half hour (the length of the tape of a cardiograph during this time might amount to 100 meters). The number of sittings is practically unlimited. The electronic memory of the instrument can preserve for a long time the picture obtained and with the help of a special attachment to the photoapparatus it can be recorded for a history of the illness.

Of course, the rhythmocardioscope does not replace the cardiograph which displays the work of the heart in 12 measurements. The new instrument shows only one. But, precisely an arrhythmia is what accompanies practically all cardio-vascular illnesses. A correct determination of the variety of arrhythmia helps physicians to make an exact diagnosis.

The rhythmocardioscope can be not only a reliable diagnostician of disturbances of cardiac rhythm, but also an aid to the physician at the time of operations. It shows how a recently taken medicine is affecting the patient, controls the cardiac activity in well people and in workers in particular situations. It can be used at the time of mass prophylactic examinations.

The name of another new cardiology instrument--a pulse deficit measurer--defines its purpose exactly. Anybody can measure his own pulse on his wrist. But there are situations where, in fact, the heart works more intensely. This occurs in some disturbances of the cardiac rhythm or in vascular diseases. The new instrument allows one, simultaneously, to see two magnitudes: the frequency of cardiac contractions and the frequency of the pulse and allows one to determine at the same time if there exists a deficit.

In intensive therapy wards the heart of each patient is under constant surveillance of the duty physician. Cardiocomplexes follow the work of the heart and when the indices exceed the defined limits an "alert" signal is activated. With each year the system of automated control becomes more highly perfected. This is how its new model will work.

Information from cardiomonitors from each of six patients arrives at a central observation post. Here an electronic computer compiles it on one page, draws a table: at such and such a time, in such and such a patient, there occurred such and such disturbances of cardiac activity. If this is dangerous for the patient, the alert signal will follow, but it will vary depending on the level of urgency of medical assistance. The signal "Attention" lights up--the frequency of cardiac contractions has become greater or on the other hand, less. "Alert" signifies that urgent intervention is necessary. Then, when the crisis has passed, the physician, with the help of the electronic memory, may see on the screen of the monitor what exactly was the cause of the sudden worsening. Possible technical faults of the electronic computer are not taken for cardiac defects and the machine communicates this with a calm signal. The machine "Electronika" will remember the results of all clinical examinations and can even correct the physician's diagnosis. And, in size, it is only as big as a book. Of course, such a machine can not replace the big computer centers of large clinics and medical establishments, where, in a few seconds, cardiograms are processed, histories of illnesses are filled in and diagnoses are made. But there are not so many such medical centers, whereas there are around 30,000 hospitals in our country. For them, a new apparatus has been created which is capable of being an experienced diagnostician and a round-the-clock nurse. Besides, the cardiocomplex is compact, reliable and inexpensive.

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PHYSIOLOGY

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DEVELOPMENT OF PHYSIOLOGICAL SCIENCE IN THE KAZAKH SSR

Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 9, 1979, pp 4-9

[Article by Kazakh SSR Academy of Sciences Academician N. Yu. Bazanova devoted to the 13th Congress of the All-Union Physiological Society imeni I. P. Pavlov]

[Excerpt] Work in these directions enjoyed further development beginning in 1966, in connection with which the Institute of Physiology formed new laboratories outfitted with modern equipment. The research is being conducted with the use of modern biochemical, biophysical, electrophysiological, and histocytological techniques.

The Institute of Physiology is presently pursuing settled fundamental research directions in the physiology of visceral systems. Participating in work on the national problem "Human and Animal Physiology", the institute collective is studying neurohumoral regulation of visceral systems (lymphatic, cardiovascular, thermoregulatory), and the phsyiology of digestion and lactation in agricultural animals.

Laboratories of lymph circulation, general physiology, comparative physiology, biochemistry, and pharmacology are working in the first research direction. These problems are being worked on to some extent by the laboratories of bioelectronics and membrane physiology. The laboratories of digestion physiology and lactation physiology are working in the second direction.

The institute's creative ties with scientific institutions in our country and in socialist countries have broadened significantly. The Institute of Physiology has organized a large number of republic, interrepublic and all-union conferences and symposiums.

The large amount of facts accumulated by the laboratory of lymph circulation in research on reflex regulation of the lymphatic system and on its mutual relationships with other organs made it possible to tackle problems pertaining to the mechanisms of lymph formation and transport. The role of the central nervous system in regulation of lymph circulation was studied with this purpose in mind. It was discovered that some structures of the limbic cortex, the hippocampus, the hypothalamus, and the medulla oblongata influence the cardiovascular system and respiration, and change the intensity of lymph formation and movement. The motor functions of lymph vessels were discovered to play the dominant role in changes in lymph flow (A. M. Beketayev, L. E. Bulekbayeva, R. A. Gareyev, T. D. Kim).

Research aimed at clarifying the mutual relationships between lymph formation and microcirculation enjoyed further development. Regional differences were revealed in the permeability of the hematolymphatic barrier and in its change in response to the effects of histamine, serotonin, bradykinin, and so on. The ratio of proteins and amino acids before and after lymph nodes is being studied under these same conditions.

Research conducted with isolated regions and organs--that is, in conditions precluding the influences of a number of factors on lymph formation--helped to clarify the mechanisms of lymph formation. It was demonstrated that changes in lymph formation depend to a certain extent on basal tone and self-regulation of the blood channel. The association between lymph formation and changes in arterial and venous pressure reveal themselves to the greatest degree in isolated hindlimbs of dogs administered papaverine--a myogenic spasmolytic that blocks self-regulation. We can assume on the basis of these data that the functional activity of the lymph capillaries themselves is a significant element of lymph formation. Thus a decline in energy metabolism accompanying hypoxia and hypothermy caused a reduction in lymph formation, while organ infiltration remained relatively constant and the vascular channel exhibited a tendency for dilation. Blockage of redox processes by cyanides significantly reduced the extent to which lymph formation depended on blood pressure. These facts are interesting in that up to this time, lymph capillaries were esentially relegated to the role of a passive interstitial drain system.

Research conducted by the laboratory of lymph formation on the permeability of lymph vessels to low molecular weight compounds showed that the volume of water leaving the lumen of lymph vessels depends not on diffusion but primarily on filtration, apparently governed by Starling's ratio of hydrostatic and oncotic pressure.

It is known that the contractile activity of lymph vessels plays the dominant role in lymph transport. The laboratory has been studying this feature of isolated lymph vessels for many years. Its work has shown that calcium ions play the dominant role in the contractile activity of lymph vessels, and that catecholamines have an influence on the contractile activity of lymph vessels; the laboratory has also identified the adrenergic receptor apparatus. The action of different substances on the smooth muscles of lymph vessels has been subjected to pharmacological analysis.

Recently (1974) the problem concerning regulation of lymph formation and lymph circulation enjoyed further development in the comparative physiological aspect in the laboratory of comparative physiology. This work is important not only to evolutional physiology but also to determination and comprehension of the fundamental laws of lymph formation and lymph dynamics in normal conditions and in the presence of some forms of lymph vessel pathology.

Differences have been revealed in the protein composition and physicochemical properties of lymph from different vertebrates (fish, amphibians, reptiles, birds, mammals), these differences being associated with type of diet and way of life.

Lymph was found to have a homeostatic role in poikilotherms (frog, turtle) birds, (duck, chicken), and mammals (cat, dog) in response to osmotic changes in blood, changes in blood volume, and changes in the action of nervous and humoral factors. The mutual relationships between changes in hemodynamics, lymph flow, and lymph formation accompanying the bodily adaptive reactions of lower vertebrates and birds have been revealed.

The results of these studies show that the vertebrate lymph system participates in the body's adaptive reactions to environmental changes very early on the evolutionary ladder.

Research being conducted by the biochemistry laboratory on the participation of the lymphatic system in the transport and alteration of protein, lipids, and lipoprotein compounds is quite interesting.

For a number of years the laboratory of general physiology has been studying interoceptive regulation of coronary circulation as one of the elements of peripheral hemodynamics. The laboratory has experimentally established participation of organ and vascular receptors in the respiratory tract, the gastrointestinal tract, the liver, the spleen, the urinary organs, and the genitalia in reactions of myocardial blood supply.

The role of vasomotor structures of the medulla oblongata and the spinal cord in regulation of coronary circulation as well as in regulation of the resistance and volumetric parameters of other vascular areas, and of the blood's electrolyte composition has been studied.

Many years of research on the influence of hypoxic and hypercapnic factors (the laboratory of extreme effects, 1972) on coronary hemodynamics and on the mechanisms of action of coronary pharmacological preparations was the basis for studying recurrent hypoxic-hypercapnic influences on the overall resistance of the human and animal body, and on coronary blood aupply. It was established in this case that recurrent short-lasting hypoxic-hypercapnic influences have a more-pronounced positive effect on both overall body resistance and the respiratory and circulatory functions, in comparison with similar influences produced by hypoxia alone. In this case animals experience a significant improvement in myocardial blood supply, their resistance to high altitude factors rises, and their survival of experimental coronarospasm increases. People trained to breath through an additional dead space (ADP) also exhibit improvements in cardiac activity indicators, and the ventilating capabilities of respiratory functions, which are responsible for maintaining a reserve of oxygen in extreme conditions, increase.

The laboratory will direct its subsequent research at qualifying the mechanisms and revealed laws, and at justifying the recommendations for practical utilization of the positive influence of training in hypoxic-hypercapnic conditions to prevent cardiovascular illnesses.

Colleagues of the pharmacology laboratory are studying the pharmacological properties and chemical nature of medicinal plants of the Kazakh SSR with the goal of finding new, highly effective drugs influencing predominantly the cardiovascular and central nervous systems and possessing antiinflammatory properties.

The laboratory of membrane physiology, created in 1974, is conducting research in molecular biology. Its work is of considerable interest to studies of the molecular substrates of muscle contraction and especially the motor functions of smooth muscle fibers responsible for the tone of blood and lymph vessels. The laboratory is developing new methods for acquiring fragments of sarcoplasmic reticulum from the skeletal and smooth muscles with high ATP-ase and transport activity. The work is going on in two directions: On one hand the laboratory is directly studying membrane systems participating in active and passive transport of monovalent and bivalent cations participating in the stimulation-contraction-relaxation cycle; on the other hand it is studying the processes of supermolecular regulation of membrane systems. Many years of research have led to development of methods for obtaining highly purified preparations of the superficial membrane of muscle fibers--sarcolemma, and to an understanding of the properties of different forms of transport ATP-ase--Mg-ATP-ase, Ca-ATP-ase, Na-ATP-ase, K-ATP-ase; this has made it possible to establish significant differences in the membrane systems of sarcolemma taken from quickly responding and slowly responding skeletal muscles. This line of research has revealed, for the first time, the inhibitory action of acetylcholine on specific transport ATP-ase in the superficial membrane of fast and slow frog muscles. Research has been conducted on the inhibition kinetics and on the possibility that acetylcholine may act upon ATP-ase activity through the cholinesterase and cholinoreceptor components of the membrane.

Acetylcholine regulation of calcium binding by membranes of the sarcoplasmic reticulum of skeletal muscles was demonstrated for the first time. It was concluded that there is no such thing as supermolecular regulation by acetylcholine, and the latter's direct influence on membrane structures was demonstrated. Presently the laboratory is generalizing its accumulated data with the goal of arriving at a general picture of the molecular basis of electromechanical contraction and of the processes responsible for regulation in skeletal, cardiac, and smooth muscles.

The laboratory of bioelectronics, organized in 1966, is studying the neurophysiological aspects of thermoregulation at the spinal cord level using microelectrode techniques and computers. It is studying the functional state of the nervous apparatus of the spinal cord in response to stimulation of skin receptors. Integrated research is being conducted on the activity of the spinal cord's interneurons and the afferent fibers of the posterior roots with the goal of determining the difference between first-order and second-order neurons.

It has been revealed that most neurons that are excited by temperature effects are localized in the dorsal horn of the marginal zone. It was demonstrated that the spinal cord's posterior columns make up the conducting pathway for temperature effects. Research is also being conducted on responses by interneurons of the lateral horn, pregangliar neurons, and motor neurons to thermal stimulation of the skin. The revealed reactions indicate that integration of reactions to thermal stimulation of the skin is possible at the segmental level.

The responses of spinal cord neurons are being studied in connection with vascular reactions and the electric activity exhibited by sympathetic fibers in response to thermal effects; the goal of this research is to reveal the way the autonomic nervous system participates in thermoregulation. The experimental data were checked against observations of people. It was shown that the H-reflex undergoes the same changes in response to thermal stimulation of shank skin as does the monosynaptic reflex in experimental conditions.

Work is beginning on the comparative physiology of thermoregulation with the objective of revealing the development of the morphofunctional fundamentals of thermoregulation.

The institute is devoting a great deal of attention to research aimed at raising livestock productivity.

The main task of the laboratory of digestion and lactation physiology is to reveal the mechanism behind regulation of the activities of the digestive system and mammary glands in different species of agricultural animals. Having a certain applied orientation, these studies must at the same time answer fundamental, general theoretical problems in physiology. This research has led to creation of an original scientific direction in development of agricultural animal physiology. This direction is represented mainly by investigations of neurohumoral regulation of the activities of digestive and mammary glands.

The institute is studying membrane digestion in agricultural animals. In addition to studying the activity of rumen mucosa, the institute is studying the activity of abomasum mucosa, though the published data do negate the possibility of membrane digestion in the stomach. That the mucous membrane of the abomasum exhibits activity was confirmed by electron microscopy, which showed that cells of the superficial epithelium of the absomasum are cylindrical and that the nucleus is shifted towards the base of the cell. There are cytoplasmic protrusions 2,500-4000 Å long on the surfaces of the epithelial cells. They are similar to the intestinal microvilli established by A. M. Ugolev, the only difference being that they are somewhat shorter and irregularly distributed. In some cells the microvilli are thickly distributed, in close contact with one another, while in others they are somewhat less abundant. A similar pattern was observed for the gastric mucosa of dogs.

The obtained data showed that in addition to secretion of gastric juices, rumen mucosa supplements, by means of its protoplasmic protrusions, cleavage of nutrients and their absorption.

Many years of joint effort by the Kazakh SSR Academy of Sciences Institute of Physiology and the Slovak Academy of Sciences Institute of Agricultural Animal Physiology on nitrogen metabolism in ruminants has led to development of the procedures for obtaining a synthetic ration in which carbamide is used as the feed protein substitute. The synthetic ration has been tested on polyfistulated animals in the laboratory of digestion physiology with the participation of Czechoslovak scientists, and it will be introduced into the agricultural practices of Czechoslavakia and our country.

Research on biochemical processes occurring in the ruminant rumen demonstrated propionic acid to be especially significant to metabolism. Propionic acid silage, which demonstrated a high impact in production tests, is now being used in animal husbandry. It is being utilized successfully as feed for productive animals in the Kazakh SSR, the RSFSR, and the Ukrainian SSR.

Research conducted by the laboratory of lactation physiology (1970) is directed mainly at the mechanism responsible for inhibition of milk production, which has hypolactation at its basis. A system for inhibiting milk production has been proposed on the basis of the obtained results.

New data have been acquired on the action of ganglionic blocking agents and adrenostimulants on the mammary gland. These data permitted the hypothesis that catecholamines influence lactation by affecting both alpha- and beta-adrenoreceptors. Research on development of mammary gland function in the first days of lactation in different species of animals has important significance.

Scientists working in institutions of higher education of Alma-Ata, Karaganda, Semipalatinsk, Aktyubinsk, Tselinograd, and other cities are making a great contribution to the development of physiology in the Kazakh SSR. The Institute of Physiology provides coordination to scientific research in the republic, offering consultative and methodological assistance to the institutions of higher education both in the research and in scientist training.

Colleagues of the department of human and animal physiology of the Kazakh SSR State University are conducting extensive research aimed at revealing the influence of Kazakhstan's climatic factors on the human body, and the adaptive mechanisms put in to play in response to these conditions. As a result of many years of work they established a certain community in the mechanisms responsible for the body's adaptation to high altitude and to the effects of high desert temperature; the research has also led to development of regional standards for the characteristics of a number of functional systems in the healthy body relative to different climatic conditions.

The collective of the department of normal physiology at the Alma-Ata State Medical Institute, which has been working in close scientific contact with the laboratory of lymph circulation, has acquired considerable data on the composition and properties of lymph, on the processes of its formation, and on changes in its flow rate depending on exteroceptive and interoreceptive influences. Data on reflex regulation of lymph circulation and venous circulation in postnatal ontogenesis are highly interesting. The morphofunctional features of the lymphatic system in different age periods, and its role in self-regulation and adaptation of the cardiovascular system to various conditions have been revealed.

The department of normal physiology of the Karaganda Medical Institute is studying the influence of superhigh and ultrahigh frequency electromagnetic fields on cardiovascular and other functional systems of the body.

The Karaganda State University's department of physiology is studying a number of characteristics of lymph and blood in response to stimulation of gastrointestinal secret

The VUZ's of Semipalatinsk are studying the physiology of lymph circulation in organs of the abdominal cavity (Semipalatinsk Zooveterinary Institute) and central regulation of the cardiovascular system (Semipalatinsk Medical Institute).

The Institute of Marginal Pathology and the departments of normal physiology of the Alma-Ata and Karaganda medical institutes are working on pressing problems in labor physiology.

Implementing the decisions of the 25th CPSU Congress, the physiologists of our republic will apply all of their effort to developing the scientific fundamentals of the physiology of the cardiovascular and other visceral systems.
[64-11004]

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11004
CSO: 1840

FIRST PRIZE WINNER OF THE A. P. KARPINSKIY PRIZE

IZVESTIYA SOVETOV NARODNYKH DEPUTATOV SSR in Russian 14 Oct 79 p 2

[Text] Leningrad, 12 Oct (TASS)--A complimentary diploma and the medal of the prize winner of the A. P. Karpinskiy Prize, founded by a foundation of the city of Hamburg (FRG) for outstanding scientific work, discoveries and inventions of Soviet scientists in the sphere of natural and social sciences were delivered today to the Vice-President of the USSR Academy of Sciences, Academician Yu. A. Ovchinnikov. He was awarded this prize for a cycle of works on the bases of the transport of ions through biological membranes.

Academician Yu. A. Ovchinnikov became the first prize winner of the West German prize, named in honor of the remarkable Russian and Soviet scientist, a prize whose goal, as underlined in its rules, is "to further the improvement of relations between the USSR and the FRG, to contribute to the development of science."

CSO: 1840

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

UDC 616.9-0.36.25.001.5

FUNCTIONS OF TROPICAL DISEASES COORDINATION CENTER

Moscow LABORATORNOYE DELO in Russian No 9, 1979

[Article by G. P. Nikolayevskiy: "Creation of the All-Union Coordinating Center for Tropical Diseases"]

[Text] In execution of Order No 373 of the USSR Ministry of Health dated 25 April 1977 "Coordination of Scientific Research in Tropical Medicine," the All-Union Coordinating Center for Tropical Diseases was created in September 1978.

The functions of the center are carried out by the Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy; the center's director is institute director Professor F. F. Soprunov.

The center coordinates its activities with the Parasitic Tropical Diseases Problems Commission under the USSR Academy of Medical Sciences.

The center's main tasks are:

1. To expand the coordination of scientific research in the USSR in the main parasitic tropical diseases (malaria, schistosomiasis, filariasis, leishmaniasis, and trypanosomiasis) within the framework of the special tropical program of the World Health Organization (WHO) in the field of epidemiology of tropical diseases, clinical practices, immunology and preventive immunization, chemotherapy and chemioprophylaxis, parasite biology, the biology of carriers and intermediate hosts and methods of controlling them, and field testing of means and methods of controlling carriers of parasitic tropical diseases.

2. To collaborate with WHO and other foreign organizations and institutions participating in research into tropical parasitic diseases.

3. To collaborate with scientific institutions of the socialist and developing countries.

The center is responsible for training and upgrading cadres of Soviet and foreign specialists on parasitic tropical diseases, scientific-methodology work with Soviet physicians working in tropical cadres, and preparing the appropriate scientific-methodological literature.

The center also takes part in organizing and conducting international conferences, congresses, symposia, and other measures involving tropical medicine and supplies interested institutions with information concerning the current state of scientific research in tropical medicine and progress in implementing the WHO special tropical program. The center does consulting work concerning the proper formulation of documentation on the development of scientific themes to be submitted to WHO in order to obtain monetary subsidies (grants) from WHO. The center has deemed it essential to inform the USSR's scientific institutions in order to get them actively involved in tropical research.

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CSO: 1840

USSR UDC 614.774:628.381:676

SANITARY AND TOXICOLOGICAL EVALUATION OF ACTIVATED SLUDGE FROM PAPER AND PULP COMBINES AS FERTILIZERS FOR SOILS OF THE NONCHERNOZEM ZONE

Moscow GIGIYENA I SANITARIYA in Russian No 9, 1979 pp 80-82 manuscript received 24 Jul 78

SELYUZHITSKIY, G. V., professor, IVANOVA, N. A., candidate of biological sciences, ZUBETS, T. P., candidate of agricultural sciences and BARANOVA, L. N., Leningrad Sanitation and Hygiene Medical Institute; All-Union Scientific Research Institute of Agricultural Microbiology; Institute of Oncology imeni N. N. Petrov, USSR Ministry of Health, Leningrad

[Abstract] A study of excessively activated sludge from a paper and pulp plant recommended by the Leningrad Agricultural Institute for use as a fertilizer for acid soils (brown podzol acid soil) involved a study of the sanitary state of the soil after composting with the sludge for 4 months. Determination of the self-purifying capacities of the soil and the transformation of substance in the sludge indicated the transformation of phenols in the soil after application of the sludge enhances formation of less toxic components. A study of migration of benzapyrine in the soil showed that a dose of sludge of 60 tons/hectare increased its concentration only by 0.23 mkg/kg. This does not constitute an environmental hazard. References 4 (Russian).
[501-2791]

USSR UDC 535.2+631.4

EFFECT OF GAMMA-RADIATION ON THE WATER STABILITY OF SOIL AGGREGATES AND THE SORPTION OF NITROGEN BY THE SOIL

Moscow INZVESTIYA TIMIRYAZEVSKOY SEL'SKOKHOZYAYSTVENNOU AKADEMII in Russian No 5, 1979 pp 169-171 manuscript received 12 Dec 78

EFROS, S. M., Chair of Applied Atomic Physics and Radiochemistry

[Abstract] The effect of gamma-radiation on the structural and adsorption properties of soils was studied using air-dried soddy podzol samples from the plowed area from a region near Moscow. Samples (25 grams) were studied on a MPX-gamma - 100 gamma device (source of gamma-radiation - ^{60}Co), with a dose power 0.75 Mrads/hour. The adsorption capacity of the soil under gamma-irradiation increased due to the increase of number of active centers, that is, the increase of adsorption activity of the soil, but gamma radiation in doses from 0-1000 Mrad did not affect the adsorption capacity and porosity of the soil particles. Figure 1; references 11: 6 Russian, 5 Western.
[506-2791]

USSR UDC 615.224.543.51

BIOLOGICALLY ACTIVE STABLE RADICALS. XIV. MASS-SPECTROMATIC STUDY OF SPIN LABELLED DERIVATIVES OF STROPHANTHIDINS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 5 No 9, Sep 79 pp 1385-1389 manuscript received 1 Feb 79

ZHDANOV, R. I., MIRSALIKHOVA, N. M. and ROZANTSEV, E. G., Institute of Chemical Physics, USSR Academy of Sciences, ROZYNOV, B. V. and RESHETOVA, O. S., Institute of Bioorganic Chemistry imeni N. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] Two spin-labelled derivatives of strophanthidin were produced by the interaction of strophanthidin with nitroxyl radicals containing the primary amino group and the structures of the radicals produced were confirmed by data of infra-red, electron paramagnetic resonance and mass spectra. Mass spectra of imines (11a, b) contained peaks characteristic of splitting of nitroxyls and peaks of ions with m/e 358, 340, 187, 160. These findings suggested that substitution of aldehyde group in position 19 of strphanthidin for the imino group increases resistance of the molecule to electron impact. (Note: present address of Mirsalikhova is the Institute of Biochemistry, Uzbek SSR Academy of Sciences, Tashkent.) Figures 2; references 11: 7 Russian, 4 Western.

[35-2791]

USSR UDC 547.915.07

SYNTHESIS OF SERIES 1 PROSTAGLANDINS FROM 11-DESOXYPROSTAGLANDIN E_1

Moscow BIOORGANICHESKAYA KHIMIYA [Biorganic Chemistry] in Russian Vol 5 No 9, Sep 79 pp 1424-1426 manuscript received 7 Apr 79

MEL'NIKOVA, V. I. and PIVNITSKIY, K. K., Institute of Experimental Endocrinology and Chemistry of Hormones, USSR Academy of Medical Sciences, Moscow

[Abstract] A method of conversion of 11-desoxyprostaglandin E_1 into some series 1 prostaglandins with use of the sulphenylation reaction was described. The 11-desoxyprostaglandin E_1 was converted into prostaglandin A_1 methyl ester by phenylsulphenylation and pyrolysis of the phenylsulfoxide derivative. Prostaglandin A_1 was converted into racemic prostaglandin E_1 and prostaglandin F_{1a}. This method converts synthesis of 11-desoxyprostaglandins into new completely chemical synthesis of natural prostaglandins. References 9: 1 Russian, 8 Western.

[35-2791]

USSR UDC 615.471:616-073.7-71

INVESTIGATION OF THE EFFECT OF HIGH-AMPLITUDE ELECTRICAL PULSES ON THE STRENGTH OF A BLOOD-VESSEL COAGULATION COMMISURE

Moscow MEDITSINSKAYA TEKHNIKA in Russian No 4, 1979 pp 29-30 manuscript received 31 Jan 79

BELOV, S. V., All-Union Scientific Research Institute of Medical Instrument Building, Moscow

[Abstract] Quantitative data on the effect of high amplitude electrical pulses on the strength of a coagulation commissure are given, comparing effects produced by modulated and non-modulated current. The method of Sigel, et al, was used (cited in a reference). Strength was examined in rupture in vitro in blood vessels (1-3 mm) of rabbits. At one end of the vessel, a tube of the same diameter allowed a physiological solution to enter the vessel; coagulation was formed at the other end. Strength was tested with sinusoidal nonmodulated and modulated current of frequency 1.76 MHz. Consequently, coagulation took place with the same current with preliminary action of high amplitude electrical pulses as recommended in the literature. Results show that increase in strength of a coagulation commissure under influence of pulses with recommended parameters increased 1.6 times. With use of weak and nonmodified current no difference in the coagulation commissure was observed. References 3: 2 Russian, 1 Western (cited from a Russian text on international conferences).
[513-12152]

12152
CSO: 1840

USSR UDC 612.822.014.424.5

HETEROGENICITY OF REACTIONS OF NEUROCYTES FROM VARIOUS PARTS OF THE BRAIN TO REPEATED ULTRAHIGH FREQUENCY RADIATION

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII in Russian Vol 79 No 7, 1979 pp 880-884 manuscript received 7 Jul 78

GALKINA, N. S. and UKHOV, YU. I., Department of Histology and Embryology, Ryazan Medical Institute imeni I. P. Pavlov

[Abstract] The degree of chromatolysis of basophile neurocytes was determined according to a three stage scale. The first stage saw initial chromatolysis near the dendrite foundations and initial cytoplasm swelling and cell rounding. These features increased in stage II and were complete in stage III. Tests were conducted on 45 male rats of 150-200 grams in weight, which were irradiated and then decapitated and samples taken from the brain. The greatest effects were found in the parietal area of the cortex, with some swelling in the respiratory and motor centers. The variations were related to protein synthesizing processes, and return to normal forms began within 5 days after the cessation of irradiation. Figures 2; references 10: 7 Russian, 3 Western.
[49-12131]

USSR

THRESHOLDS OF DISCRIMINATION BETWEEN THE FORMS OF MOVING OBJECTS

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA, SERIYA 14 PSIKHOLOGIYA in Russian No 2, Apr/Jun 79 pp 61-64 manuscript received 2 Feb 79

LOGVINENKO, A. D. and LINDE, N. D.

[Abstract] Considerable empirical work has been done on the changes in vision acuity during movement of objects, relative to the observer. Nevertheless, differential thresholds of discrimination between forms of moving objects have been poorly studied. This investigation concentrated on the dependence of differential discrimination and the speed of test objects. Test patterns consisted of two moving rectangles projected on a screen, one test and one control image. The differential threshold of the recognition of their relative sizes was determined as a function of the rate of movement. Experiments included conditions of tracking eye movement and fixation of the eyes. It was established that the differential sensitivity

decreased exponentially with increased velocity. In contrast, the dynamic visual acuity diminished gradually with increased object velocity. Therefore, dynamic visual acuity cannot be considered as the universal characteristic of the perception of moving objects. Figures 4; references 4: 1 Russian, 3 Western.
[27-7813]

USSR UDC 575.591

ECOLOGIC DETERMINATION OF CHANGES IN THE GENE FREQUENCIES FOR POLYMORPHIC SYSTEMS AMONG NEWCOMERS TO THE NORTHEASTERN USSR

Moscow GENETIKA in Russian Vol 15 No 10, Oct 79 pp 1775-1783

SOLOVENCHUK, L. L., Institute of the Biological Problems of the North,
Far Eastern Scientific Center, USSR Academy of Sciences, Magadan

[Abstract] Comparative studies were conducted on genetic polymorphism in 1051 residents of Magadan, all of Russian nationality, ranging in age from 18 to 60 years, in relation to the duration of stay in the region. Evaluation of the haptoglobin, serum alkaline phosphatase, and erythrocyte acid phosphatase, phosphoglucomutase, glutamate-pyruvate transaminase, 6-phosphogluconate dehydrogenase, and adenyl kinase systems, showed marked differences in the pheno-genotypic frequencies in the case of the AcPAA and AcPCA genotypes of erythrocyte acid phosphatase and in the Pp_1 and Pp_2 genotypes of serum alkaline phosphatase between populations with short- and long-term stays (over 4 yrs). The latter frequencies approached that of the native-born population. While the findings are incomplete and preliminary in nature, they suggest that to the extent that human migration and settlement patterns are influenced by ecologic factors, the ecologic factors do play a role in the genetic polymorphism pattern of long-term immigrants in the Soviet northeastern regions. References 20: 11 Russian, 9 Western.
[78-12172]

USSR UDC 331.015.11

PROSPECTS OF MEDICAL ERGONOMICS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 9, 1979 pp 65-68

SHEVYAKOV, O. V., Moscow

[Abstract] The need for and prospects of the development of medical ergonomics in response to the extensive introduction into medical practice of computer technique and combined therapeutic and diagnostic apparatus were discussed. Effective use of medical ergonomics requires effective distribution in a system of both medical personnel and medical cybernetic apparatus. This apparatus must be designed in consideration of maximal adaptation to medical specialists with special attention to data input into the machine by the operator. References 6 (Russian).
[507-2791]

USSR UDC 576.312.37:595.77

KARYOTYPE OF THE MOSQUITO CHIRONOMUS BEHNINGI IN THE ARAL SEA BASIN

Leningrad TSITOLOGIYA in Russian Vol 21 No 9, Sep 79 pp 1103-1106 manuscrip- received 6 Feb 78

BELYANINA, S. I. and KOLOSOVA, T. A., Chair of Biology, Saratov Medical Institute; Aral Branch, Kazakh Scientific Research Fishery Institute

[Abstract] Karyotypic analyses were conducted on larvae of the mosquito Chironomus behningi collected from lakes Akchatau, Kotan-Kul', and Chumysh-Kul' in the Aral Sea basin. The findings demonstrated the presence of 4 chromosome pairs ($2n = 8$); 3 chromosomes(I, II, and III)of approximately equal length (97.67-115.64 nm), and one shorter (IVth) chromosome (44.93 nm). The observed populations evidenced a high degree of genomic polymorphism, with ca. 38% of the larvae containing an additional microchromosome (B chromosome; $2n = 8 + m$). While no inversions were observed, 2.3% of the larval specimens contained one of two types of heterozygote reciprocal translocations. Figures 4; references 18: 11 Russian, 7 Western.
[70-12172]

Epidemiology

USSR UDC 616.34-022-084:374

ROLE OF HYGIENIC TRAINING IN PREVENTION OF ACUTE INTESTINAL INFECTIONS UNDER CONDITIONS OF THE BAYKAL-AMUR TRUNK LINE

Moscow GIGIYENA I SANITARIYA in Russian No 9, 1979 pp 35-39 manuscript received 12 Feb 79

DYMSHITS, V. YA. and MITROFANOV, V. YE., Medical-Sanitary Service of the Directorate of BAM Construction, Tynda, Amur Oblast

[Abstract] A program of instruction and training (emphasizing aspecta applicable to men under 30-year age; range of most of the railroad builders) was directed at providing information so the persons involved could provide for their own health and the health of the collective, especially in respect to adaptation to severe climatic conditions. The program includes instructional letters to all sections of the lines, increase of antiinfection and prophylaxis information using all media outlets and lectures and seminars. Some lectures concentrated on work among pre-school and school children. The program resulted in an almost 2-fold reduction of incidence of intestinal infections in 1978 with no major outbreak of these diseases among the railroad workers. References 3 (Russian).

[501-2791]

USSR UDC 616.981.718-036.2(470.345)

Q FEVER IN THE MORDOVIAN ASSR

Moscow ZHURANL MIKORBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 5, May 79 pp 91-93 manuscript received 30 Jun 78

BATSINA, Z. A., IL'INSKIY, YU. A., KAMBARATOV, P. I. and KAMBARATOVA, L. A., Mordovian University imeni Ogarev, Saransk and Second Moscow Medical Institute imeni Pirogov

[Abstract] Complement fixation with antigen from Rikketsia Burneti was used to test patients with elevated temperature for Q fever in the Mordovian ASSR. From January 1972 to August 1977, positive results were found in 14.3% of patients at the Saransk Infectious Disease Hospital and 8.2% of patients in other Saransk therapeutic institutions. About a third of the positive patients had low titers; these results were considered anomalous. In 65 patients, Q fever diagnosis was confirmed. Positive complement fixation results were more frequent in persons consuming milk in their

diet and in workers in a meat-packing plant. Inhabitants of rural areas had a higher percentage positives than did city dwellers. The data indicate that the major routes of transmission of Q fever in the Mordovian ASSR are alimentary and contact, and that Q fever is a significant factor in the public health of the Mordovian ASSR. References 10 (Russian).

USSR UDC 616.935-036.21-078

CERTAIN REGULARITIES IN THE DYNAMICS OF THE SH. SONNEI DYSENTERY EPIDEMIC PROCESS DEPENDING ON THE TYPE OF INFECTIVE AGENT

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 5, May 79 pp 38-44 manuscript received 4 May 78

BRIKO, N. I., KRIVDA, YU. G., PALTYSHEV, I. P., LIVENKO, B. P., OGURTSOVA, S. D., DEMCHENKO, L. I. and FEDOSYUK, R. YA., First Moscow Medical Institute imeni Sechenov

[Abstract] In order to clarify the reasons for sick-rate periodicity in Sh. sonnei dysentery, about which conflicting views appear in the literature, rates of dysentery and of similar intestinal infections in three Moscow rayons, from 1962 to 1977, were studied. Three year intervals between peaks, with a higher peak in 1972, were seen only for the dynsentery. In peak years, except for the lower 1975 peak, Sh. sonnei predominated over other types of dysentery more markedly. Analysis of biochemical types showed that fermentative type one has tended to increase and type three to decrease in frequency. Biochemical type two demonstrated marked three-year periodicity with peaks corresponding to disease rate peaks. A cohort analysis study of the data on children to nine years of age indicated marked dysentery periodicity following that of the general population, with older children more at risk only in peak years. These results can only be explained using factors influencing the second level of the epidemiological process, including immunological factors. Figures 4; references 29 (Russian).

USSR UDC 616-036.21(571.62)

MAIN CONCLUSIONS OF A SURVEY OF NATURAL FOCI OF HUMAN INFECTION IN THE AMUR-BUREYA SECTION OF THE BAIKAL-AMUR RAILROAD

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 5, May 79 pp 34-38 manuscript received 17 Feb 78

KORENBERG, E. I., KOVALEVSKIY, YU. V., KUZIKOV, I. V., PCHELKINA, A. A., BUSOYEDOVA, N. M., REYCHUK, YE. A., MEDVEDEVA, G. I., TIMOSHENKO, V. I., SAVEL'YEVA, R. A., LEV, M. I., PLOTNIKOVA, L. F., SUVOROVA, L. G., BUSHUYEVA, L. K. and SERGEYCHIK, I. I., Institute of Epidemiology and Microbiology imeni Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] From 1975 to 1977 natural foci of human infection were studied in the rapidly growing Amur-Bureya section of the Baikal-Amur Railroad. Aerovisual investigation of the very varied terrain of the route suggested that natural foci of infection existed only below 650-750 m elevation. In this territory fivekey areas were selected from cartographic material. Zoological-parasitological investigation and collection of material for virological, bacteriological and serological tests focused on tick-borne encephalitis, tularemia, pseudotuberculosis and intestinal yersinosis, leptospirosis and rickettsiosis. There were 110 strains of tick-borne encephalitis isolated from 852 I. persculcatus pools, with the extent of infection varying from 0.1 to 3.4% of the ticks. The most dangerous areas were the easternmost sectors and individual spots along the Amgun' River. About 23% of the local residents reported tick contact in 1975 and 11% had serum antihemagglutinins. While there were no reported cases of tularemia and none found in the ticks of small mammals in 1975 to 1976, 17% of the long-term residents possessed antibodies to this disease. In 1977, two F. tularensis cultures were isolated from field mice and four Y. pseudoteberculosis cultures in 1975. Pseudotuberculosis was first reported in the area in 1976 among railroad construction workers and the causative agent was isolated from domestic mice and rats. Y. enterocolitica was also found in mice in 1975. Antibodies to leptospira were found in field mice, swine and cattle; retrospective serological investigation established a 4% probability of human infection. Richettsia were serologically detected in 7% of the I. persculcatus but no D. silvarum. References 9 (Russian).

USSR UDC 616.981.553--036.2

MEANS OF LESSENING BOTULISM INCIDENCE

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 9, 1979 pp 40-43

KABIROVA, M. B., DUBOVITSKAYA, ZH. D. and AFANAS'YEVA, L. I., Alma-Ata Institute for the Advanced Training of Physicians, Kazakh SSR Ministry of Health

[Abstract] The authors examined botulism incidence in Kazakhstan which had increased by a factor of five in the decade 1967-1976, in comparison with the previous decade. Home canning was the main source (89%), especially marinated mushrooms (36.7%) and canned vegetables (27%). Use of low quality produce, inadequate washing, inadequate salt and acidity, inadequate sterilization were causes. Mortality is 19.1%; to decrease it, immediate measures for diagnosis and early specific treatment are necessary. Laboratory diagnosis can play a large role in prophylaxis and treatment. Most of the cases were due to Cl. botulinum B (55.2%), then E (18.9%), and A (17.2%). Type B is widely found in the Kazakhstan soil (2x more than the USSR average). Recommended measures for health workers are (1) protection of food products from botulism microbial spores from the soil; (2) proper heating of products to destroy the toxin; (3) creation of conditions where spores cannot develop in food products. It will be necessary to educate the public by means of all media, radio and television about this matter. In southern Kazakhstan the dangers of mushroom canning must be elucidated; in northern rayons of the republic, the association of botulism with vegetables must be publicized. Physicians in emergency medical situations are to be alerted to appropriate treatment.
[503-12152]

USSR UDC 547.996:593.96

GLYCOSIDES OF MARINE INVERTEBRATES. VII. STRUCTURE OF HOLOTHURIN B ISOLATED FROM HOLOTHURIA ATRA

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 4, 1979 pp 522-527
manuscript received 11 May 79

STONIK, V. A., CHUMAK, A. D., ISAKOV, V. V., BELOGORTSEVA, N. I., CHIRVA, V. YA. and YELYAKOV, G. B., Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok, and the Simferopol' State University imeni M. V. Frunze

[Abstract] Chemical and physicochemical methods were used to establish the structure of holothurin B, containing a sulfate group on a carbohydrate side chain, which was isolated from Holothuria atra. The structure was found to be identical with that previously derived for holothurin B isolated from Holothuria vagabunda by Kitagawa, et al. (Tetrahedron Lett., p 985, 1978). References 12: 4 Russian, 8 Western.
[66-12172]

USSR UDC 615.372:576.851.315]012.8

STUDY OF THE POSSIBILITY OF PURIFYING CHOLERA TOXIN (CHOLEROGEN) AND ANTIBODIES TO IT BY THE METHOD OF IMMUNE ADSORPTION

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 5, May 79 pp 30-34 manuscript received 6 Feb 78

ZAKREVSKIY, V. I., YEFREMENKO, V. I., LOBANOV, V. V. and DOLMATOVA, L. A., Volgograd Scientific Research Antiplague Institute, Rostov Scientific Research Antiplague Institute

[Abstract] The use of polyacrylamide gel immune adsorption to purify cholerogen and antibodies to it was studied. Antitoxin rabbit serum, obtained by injecting animals with unpurified cell-free filtrate from Vibrio cholerae biotype 569B culture, was mixed with acetone-dried V. cholerae cells to obtain adsorbed antitoxin serum. This was further purified by ammonium sulfate precipitation and mixed with the polyacrylamide reactants. Based on antitoxin activity, the capacity of the gel was 95.9% of that of the starting material. Using gamma-globulin from control rabbits, nonspecific adsorption was found to be 2.1%. The specific adsorbant was used to purify cell-free V. cholerae culture fluid by washing with tris-sodium chloride buffer and eluting with sodium thiocyanate solution. The eluate was concentrated by ultrafiltration and salt was removed by Sephadex gel filtration. The yield was 46%, with 102,400 units of activity per mg of protein. The low yield may be due to screening of the antibodies by the gel matrix. The cholerogen obtained behaved, in precipitation, immunoelectrophoresis and double disc electrophoresis, like immunologically pure material. It was found that the capacity of the immunoadsorbant was halved by each use. When purified antigen was included in the polyacrylamide gel, antitoxin adsorbing rabbit serum antibodies, eluted like antigen, were 83.5% adsorbed. However the yield was 4.45%, due to denaturation during desorption. Figures 1; references 13: 3 Russian, 10 Western.

USSR UDC 616.94-002.7(Bact.pyocyanea)-085.37-039.71

CERTAIN PROBLEMS IN THE IMMUNOPROPHYLAXIS OF EXPERIMENTAL PYOCYANIC WOUND SEPSIS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 5, May 79 pp 67-72 manuscript received 13 Jul 78

KOLKER, I. I., STANISLAVSKIY, YE. S. and GRISHNA, I. A., Institute of Surgery imeni Vishnevskiy, USSR Academy of Medical Science, and Moscow Scientific Research Institute of Vaccines and Sera

[Abstract] Since Pseudomonas aeroginosa is becoming a common cause of post-surgical infection, a preparation from this bacterium for the immunoprophylaxis of general P. aeroginosa infection was developed and named pyoimmunogen. Five cultures isolated from patients, which belonged to the three basic groups most commonly isolated in clinical practice, were combined and subjected to long-term autofermentolysis. The preparation obtained was chromatographed on Sepharose 4B and Sephadex G-100. Pyoimmunogen reacted with antisera to the cultures which were used in its preparation but not with antisera obtained via hyperimmunization of rabbits with pyoimmunogen. No toxicity was observed in mice or guinea pigs; some pyrogenicity was seen. Immunization of rats with pyoimmunogen reduced mortality due to P. aeroginosa strain 8 wound sepsis on days 3-5 from 60% to 25% and total mortality from 91% to 7% with the optimum dosing schedule--found to be 250 μg, 500 μg and 500 μg total protein adminissterered at one day intervals. The protective ability of pyoimmunogen against the other strains used in its formulation ranged from 50% for strain 951 to 100% for strain 868. References 17: 5 Russian, 12 Western.

USSR UDC 615.371:576.851.511].015.48

PREPARATION AND STUDY OF ANTHRAX PROTECTIVE ANTIGEN. REPORT V. THE DYNAMICS OF IMMUNITY AFTER VACCINATION WITH CONCENTRATED, PURIFIED, ADSORBED CHEMICAL ANTHRAX VACCINE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 5, May 79 pp 64-67 manuscript received 20 Sep 78

SADOVOY, N. V., DERBIN, M. I., GARIN, N. S., TARUMOV, V. S., MIKHAYLOV, V. V., SHENTSEV, I. V. and FOFANOV, P. YE.

[Abstract] The dynamics of immunity in animals vaccinated with chemical anthrax vaccine derived from strain STI-1 (by a procedure developed by Derbin, et al, 1977) was compared with that from live, spore-containing vaccine. One man-dose was injected once or twice, subcutaneously, with an interval of 21 days between injections. Immunofluorescent antibodies, serum protective properties and resistance to virulent infection in guinea pigs showed that the most intense immunity was acquired by animals receiving two injections of adsorbed chemical vaccine and that the live vaccine was less effective that the chemical adsorbed. Immunity from chemical vaccine lasted 2-4 months in guinea pigs and three months in hamadryas baboons, while that from live vaccine was more long-lasting, but slower in onset. References 10: 7 Russian, 3 Western.

USSR UDC 576.851.315.097.29.07

FRACTIONATION OF VIBRIO CHOLERAE ENTEROTOXIN BY ISOELECTRIC FOCUSING IN AN AMPHOLINE GRADIENT

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII IN IMMUNOBIOLOGII in Russian No 5, May 79 pp 110-111 manuscript received 28 Nov 78

SYRESINA-NEDUGOVA, G. I., RUBTSOV, I. V. and MARTYNOV, YU. V., Central Scientific Research Institute of Epidemiology, Moscow

[Abstract] Cholerogen from Vibrio cholerae strain 569B was isolated using isoelectric focusing on an ampholine gradient. The natural pH 3.0-10.0 gradient, 2% ampholine and 30-120 mg preparation per column were employed. A saccharose gradient was also used and 600 V was applied for 48 hours at 4°C. The accumulation of liquid on ligated rabbit intestinal segments was used as an indicator of biological activity. Ten to twelve peaks were

found in all, with cholerogen activity isolated in two peaks of approximately equal activity in the pH 6.0-7.9 range. A yield of 3.8% biologically active material was achieved. A second isoelectric focusing from pH 6.0-8.0 on the material from the first peak, pI 6.9, separated it into three components. The results indicate the heterogenicity of cholerogen.

USSR UDC 613.6:663.1

SOME PROBLEMS OF LABOR HYGIENE AND THE STATE OF HEALTH OF WORKERS PRODUCING PROTEIN-VITAMIN CONCENTRATES

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIA [Labor Hygiene and Occupational Diseases] in Russian No 9, 1979 submitted 10 Apr 79 pp 23-25

MUKHAMETOVA, G. M., KURMAYEVA, A. A., KHAYRULLINA, R. M., ALIBAYEV, T. S. and YARMUKHAMETOVA, F. A., Institute of Hygiene and Occupational Diseases, Ufa

[Abstract] The title production work involves industrial exploitation of yeasts (Candida) to produce a protein-vitamin concentrate--BVK, B = protein, V = vitamin, K = concentrate. A study of the health of workers at an experimental-production plant producing BVK and at a heavy tonnage biochemical combine showed the major change resulting from contact with the production ingredients (the yeast and the paraffin) involved local and diffuse skin lesions with a direct ratio between severity and the length of contact. Skin tests showed positive reactions of varying degree to paraffin and the finished product. The complex of products used in production of the food yeasts was assumed to be the cause of functional shifts in workers' integument. Sanitation and hygiene and therapeutic prophylactic measures developed by the authors reduced dermatoses morbidity. References 3 (Russian). [500-2791]

2791
CSO: 1840

USSR UDC 614.448:632.937.15

HYGIENIC SUBSTANTIATION OF REGULATION OF USE OF BACTERIAL INSECTICIDES IN AGRICULTURE AND PERMISSIBLE RESIDUAL QUANTITIES OF THEIR PRODUCERS, Bac. thuringiensis, IN VEGETABLE PRODUCTS

Moscow GIGIYENA I SANITARIYA in Russian pp 27-31 manuscript received 16 Dec 78

DABUROV, K. N., Second Moscow Medical Institute imeni N. I. Pirogov

[Abstract] The survival rate of Bac.thuringiensis during cooking and its reproduction in prepared products and dishes were used to determine the standards of permissible residue in vegetables is 10^3/1 g and, in fruits and berries, 10^5/ 1 g. Study of the survival rate of Bac.thuringiensis

spore after processing farm crops by bacterial insecticides during single application of the insecticide, show its use to be permissible no earlier than 30 days before harvest and, for fruits and berries, no earlier than 15 days. In case of double application, the last application to vegetables should be 45-50 days before harvest and 25-30 days before harvest of fruits and berries. Multiple applications are permissible but the time of processing before harvest is to be extended proportionately. References 4 (Russian). [501-2791]

2791
CSO: 1840

USSR UDC 614.72:632.95

HYGIENIC STANDARDIZATION OF HEXACHLORAN, PHOSALONE AND BUTYPHOS IN THE AIR AFTER SEQUENTIAL USE OF THEM IN AGRICULTURE

Moscow GIGIYENA I SANITARIYA in Russian No 9, 1979 pp 14-17 manuscript received 6 Dec 78

UBAYDULLAYEV, R. and KHASANOV, T. S., Uzbek Scientific Research Institute of Sanitation, Hygiene and Occupational Diseases, Tashkent

[Abstract] After experiments involving chronic around-the-clock dosing of 4 groups of white rats with hexachloran, phosalone and butyphos (Group 1 - 5 times max permissible concentration of each substance separately; Group 2 - 2 times; Group 3 - at the maximum permissible level and Group 4 - in pure air) at high temperature in 5 periods for 125 days (15 days of exposure followed by 10 days respite), experimental rats were healthy, actively gained weight and did not differ from control rats. Reliable reduction of SH-groups in the blood occurred only in the middle of the 4th period but was normalized in the 10-day respite followed by a stable, reliable reduction at the end of dosing. The data obtained established that the daily maximal permissible concentration of these substances in the air should be at the maximum level of each one separately, that is, 0.05 mg/m^3, 0.01 mg/m^3 and 0.01 mg/m^3 respectively. References 3 (Russian).
[501-2791]

USSR UDC 613.632:669.23+615.916:546.92

TOXICOLOGY OF PLATINUM AND METALS OF THE PLATINUM GROUP

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIA in Russian No 9, Sep 79 pp 4-9 manuscript received 2 Jan 79

ROSHIN, A. V. (Moscow), VESELOV, V. G. and PANOVA, A. I., (Krasnoyarsk) Central Institute for the Advanced Training of Physicians; Medical Institute

[Abstract] Experiments involving administration of platinum or metals of the platinum group by introduction into the stomach, per os, or by inhalation, to 2920 laboratory animals (rats, mice, guinea pigs) showed the most toxic substances are simple and complex salts of metals of the platinum group which are readily soluble in water and capable of causing acute, subacute and chronic poisoning. The experiments and dynamic industrial studies established the maximum permissible levels for platinoids in production areas,

based on toxic action, were: 0.1 mg/m^3 for aerosols of condensation and pulverization of platinum metals; 0.02 mg/m^3 for aerosols of condensation of soluble compounds of platinum and iridium and 0.03 mg/m^3 for palladium, rhodium, ruthenium and osinium. Since these levels can cause allergic reactions, however, a maximum permissible level of 0.01/mg/m^3 was recommended for all aerosols of soluble salts of platinum metals; no allergic diseases were observed at this level. References 11: 8 Russian, 3 Western.
[500-2791]

2791
CSO: 1840

USSR UDC 613.632:546.45]:613.155.3]-07:616-056.43-057

USE OF IMMUNOLOGICAL METHODS OF STUDY IN CLINICAL-HYGIENIC EVALUATION OF MAXIMAL PERMISSIBLE LEVELS OF INDUSTRIAL ALLERGENS (On the Example of Maximal Permissible Level of Be in Air Surrounding the Work Zone)

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZAVOLEVANIA in Russian No 9, Sep 79 pp 9-15 manuscript received 20 Nov 78

ALEKSEYEVA, O. G., BREKHOVA, N. N., VASIL'YEVA, YE. V., VOLKOVA, A. P., GRISHINA, T. I., YERMAKOVA, N. G., KARPENKO, O. V., BOBRISHCHEV-PUSHKIN, D. M., ORLOVA, A. A. and NIKITINA, L. S. (Moscow) Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences

[Abstract] Workers from four different enterprises, differing in hygiene characteristics and production procedures involving Beryllium, underwent complex immunological examination including evaluation of allergic response autoimmune response, non-specific anti-infection immunity in order to determine the specific biological effect of the chemical allergen without development of pathologies. It was found that a Be level in air of the work zone at the maximum permissible level (0.001 mg/m^3) has a significant effect on the immune system and disturbs its regulatory mechanisms and therefore creates the danger of allergy pathologies. Figures 2; references 10: 8 Russian, 2 Western.
[500-2791]

2791
CSO: 1840

USSR UDC 616.62--06

CLINICAL PICTURE OF GASTROINTESTINAL TRACT DISORDERS WITH CHRONIC PHOSPHORUS INTOXICATION

Alma-Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 9, 1979 pp 48-50

BELOSKURSKAYA, G. I., KRYLOV, YU. V. and DZHANABAYEV, D. D., Scientific Research Institute of Regional Pathology, Kazakh SSR Ministry of Health

[Abstract] A significant frequency of gastrointestinal tract injury was found in Kazakhstan phosphorus industrial workers. In a prophylactic examination of workers, the symptoms were observed in 38.3%. Occurrence increased with length of time working in the plant and didn't depend on worker age: time of work, up to three years, 11.9%, three-four years, 35.7%, five and more years, 52.4%. The symptoms were most frequent in departments where phosphorus was the primary toxic agent. The authors examined 97 cases of phosphorus intoxication in various stages. The symptom complex in stomach and intestine developed not in isolation but in combination with symptoms of illness of other organs, disturbing the hepato-biliary, nervous and cardiovascular systems and others. Fairly early development of morphological changes of the stomach and intestine are evident. In chronic gastritis, patients with normal and increased stomach secretion, 68.7% had superficial gastritis and 25% had hypertrophic gastritis. In gastritis patients with lessened secretion, 57% had atrophic gastritis and 43% had superficial gastritis. Chronic gastritis and colitis appear to be a stage of the illness. Increased acid-forming and motor-evacuating functions are evident. With increased exposure to phosphorus, the second stage appears with decreased acid-forming and motor-evacuating functions.
[503-12152]

USSR

ELECTRON-MICROSCOPY STUDY OF THE MATURATION OF MOSQUITO DENSONUCLEOSIS VIRUS

Bratislava ACTA VIROLOGICA in Russian Vol 23 No 2, Mar 79 pp 170-172
manuscript received 12 Dec 78

BUCHATSKIY, L. P. and RAYKOVA, A. P., Kiev State University imeni T. G. Shevchenko, Kiev

[Abstract] An electron-microscope study of the maturation of mosquito densonucleosis virus (parvovirus) (MDV) in the cells of infected larvae of Aedes aegypti L. is reported. The first ultrastructural changes in the infected cells were observed 6-8 hrs after infection, both in the nuclei, and in the cytoplasm. The destruction of endoplasmatic reticulum and of organelles in the cytoplasm was observed concurrently with the formation of paracrystalline inclusions 18-20 mμ in diameter. The number of these inclusions increased with the spread of infection. Among the paracrystalline inclusions, B type microtubules were found, 20 mμ in diameter. Virogenic stroma and paracrystalline accumulations of virions were found in the nuclei of MDV infected cells. Figures, (printed separately in journal--pp XV-XVII), 4; references 13: 4 Russian, 9 Western.
[33-7813]

USSR UDC 575.24:576.858.1

MODIFICATION AND RESTRICTION OF PHAGES λ AND P1 IN ESCHERICHIA COLI CONTROLLED BY THE R124 PLASMID

Moscow GENETIKA in Russian Vol 15 No 10, Oct 79 pp 1719-1723

SKAVRONSKAYA, A. G., ALESHKIN, G. I. and DEMKIN, V. V., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] The nature of modification and restriction of bacteriophages λvir and P1vir by several R factors was investigated in an E. coli K-12 system using isogenic strains of the bacterium harboring the antibiotic resistance factors pAS26 (responsible for endonuclease R.EcoRI), R245 (R.EcoRII), and R124. Evaluation of the results demonstrated that restriction under the control of R124 differed from that exerted by pAS26 and R245 both in specificity and frequency. The restriction frequencies applicable to R124, R245, and pAS26 for λvir were, respectively, 10^{-3}, 7×10^{-3}, and 4×10^{-4}, while the corresponding frequencies for P1vir were 10^{-1}, 6×10^{-4}, and 10^{-6}. The restrictase activity coded for by R124 has been designated as R.EcoRIII in accordance with the nomenclature employed for these endonucleases. References 10 (Western).

[78-12172]

USSR UDC 576.312.32:576.858

EFFECT OF LIVE MEASLES VACCINE ON THE CELLULAR CHROMOSOME STRUCTURE OF BONE MARROW IN MICE

Kiev TSITOLOGIYA I GENETIKA in Russian No 5, 1979 pp 408-410 manuscript received 5 Jul 78

CHERKEZIYA, S. YE., GORSHUNOVA, L. P. and MIKHAYLOVA, G. R., The Institute of Virology, Moscow

[Abstract] White mice weighing 7-8 grams and 10-12 grams were given production (Moscow Scientific Research Institute of Viral Preparations, USSR Ministry of Health) measles vaccine subcutaneously in half the dosage given humans. Then metaphase samples were studied at intervals for up to 160 days. The results showed that by 60 days statistically significant chromosome aberrations, largely acentric chromatid fragments, appeared. Centromeric and telomeric chromosome associations also appeared at about the 60th day. References 11: 10 Russian, 1 English.

[12131/1840-55]

USSR UDC 612.822.1

ACTIVITY OF ACID RNASE OF THE SYNAPTOSOMAL, LYSOSOMAL, AMD MICROSOMAL FRACTIONS OF RAT BRAINS IN THE COURSE OF LEARNING

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR imeni I. M. SECHENOVA in Russian Vol 65 No 7, Jul 79 pp 967-969 manuscript received 4 Sep 78

NECHAYEVA, G. A., LOPATINA, N. G. and GLADKAYA, A. F., The Laboratory of Functional Neurochemistry and the Laboratory of Genetics of the Higher Nervous Activity, Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] For each of a series of tests two rats of the same weight and brood were selected. The test rat was subjected to a conditioned response regimen for 5 days, and then along with the control specimen, it was killed and the brain removed. Then synaptosomal, lysosomal and microsomal fractions were isolated and RNAse activity measured. Results indicated that after the training regimen the acid RNAse activity increased, particularly in the synaptosomal fraction. The least increase was noted in the purified lysosomal fraction, compared to synaptosomal and lysosomal fractions with the latter enriched with Triton X-100. The Triton X-100 in the synaptosomal fraction activated such other enzymes as acetyl cholinesterase and adenose triphosphatase. References 10: 7 Russian, 3 English.
[54-12131]

USSR UDC 576.312.32:591.465.12.085.2:612.6

CYTOGENETIC ANALYSIS OF HUMAN OOCYTES AND OF THEIR EXTRACORPOREAL MATURATION

Leningrad TSITOLOGIYA in Russian Vol 21 No 9, Sep 79 pp 1047-1052 manuscript received 13 Sep 78

PIMENOVA, M. N. and NIKITIN, A. I., Early Human Embryogenesis Group, Institute of Obstetrics and Gynecology, USSR Academy of Medical Sciences, Leningrad

[Abstract] Comparative cytogenetic studies were conducted on human oocytes immediately on removal from follicles and for a 46 h extracorporeal period of development while maintained in medium 199 at 37°C in 5% CO_2. Considerable heterogenicity was evident in the chromatin structures which presumably reflected re-initiation of meiosis in vivo and atresia. In addition, after 46 h of in vitro cultivation, 50.8% of the oocytes attained metaphase

II, but only 22.8% of them were without chromosomal abnormalities. The high incidence of abnormalities was ascribed to degenerative changes which had their onset in vivo. Figures 7; references 14: 3 Russian, 11 Western.
[70-12172]

USSR UDC 547.963.32+577.23

PRODUCTION OF HYBRID PLASMIDS CONTAINING TWO ColEi REPLICONS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 5 No 9, Sep 79 pp 1346-1351
manuscript received 5 Apr 79

BERLIN, YU. A., LEBEDENKO, YE. N., SHPAKOVSKIY, G. V. and KOROTKOV, K. O., Institute of Biorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] A method of recombination in vitro from plasmids of pBR322 (Ap^rTc^r) and CKΔ11 (Km^r) was used to produce hybrid plasmids pBR332/EcoRI-CK 11/EcoRI (pLCG1) and pBR322/Hind III - CKΔ11/Hind III ($pLCG_2$). Restriction analysis was used to establish mutual orientation of both fragments in pLCG1. Phenotypical characteristics of hybrid plasmids ($Ap^rTc^rKm^r$ and $Ap^rTc^sKm^r$) respectively showed restrictase EcoRI does not affect determinants of resistance ot antibiotics in either of the initial plasmids while Hind III inactivated Tc^r determinant in pBR322. The pLCGi plasmid may be used as a cloning vector (at the Bam HI site). The selection of recombinants is based on the phenotypical transition $Ap^rTc^r \rightarrow Ap^rTc^sKm^r$. Figures 3; references 17 (Western).

[Text Experimental Part - Paragraph 3, p 1348] Strains NM 182 E.coli (producer of EcoRI), E.coli C600 (CKΔ11) and E.coli C600 (pRSF2124) were obtained from B. G. Debabov (All-Union Scientific Research Institute of Genetics, E.coli C600 (pBR322) from P. Kuril'ski (Pasteur Institute), E.coli MM294 (pMB9) from K. G. Skryabin, B.amyloliquefaciens from P. M. Chumakov (USSR Academy of Sciences IMB). We used tris, sucrose, (Merck), EDTA, SDS (Serva), chloramphenicol, dithiotreit, ATP (Calbiochem) tetracycline, kanamicine, ampicilline (USSR Ministry of the Medical Industry) lysozyme (P-L Biochemicals), agarose (Bio Rad, Calbiochem) ethylbromide, bromphenol blue, $MgCl_2$ (Sigka) yeast extract, trypton, agar (Difco).
[35-2791]

USSR UDC 547.964.4.02

AMINO ACID SEQUENCE OF INSECTOTOXIN I_2 FROM VENOM OF CENTRAL ASIATIC SCORPION Buthus eupeus

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 5 No 9, Sep 79 pp 1285-1293 manuscript received 6 Apr 79

GRISHIN, YE. V., SOLDATOVA, L. N., SOLDATOV, N. M., KOSTETSKIY, P. V. and OVCHINNIKOV, YU. A., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] Insectotoxin I_2 was isolated from central Asian scorpion Buthus eupeus venom. It produces a paralyzing effect on insects. Automatic Edman degradation was used to determine the sequence of the first 33 amino acid residues. From tryptic hydrolysate of insectotoxin I_2, 9 peptides were isolated and their structure was established. Localization of 3 tryptic peptides was realized on the basis of similarity with the homologous structure of neurotoxin vI from scorpion Centruroides sculpturatus venom. It was shown that the insectotoxin consists of 62 amino acid residues and 4 intramolecular disulfide bonds. Figures 4; references 22: 5 Russian, 17 Western.
[35-2791]

USSR UDC 681.142

COMPUTERS ARE EFFECTIVE INSTRUMENTS IN MOLECULAR BIOLOGICAL STUDIES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 13 No 5, Sep/Oct 79 pp 983-993 manuscript received 22 Nov 78

KAMINIR, L. B., Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] The introduction of third generation computers to laboratory experiments in molecular biology has resulted in a number of advantages in the area of automation, modeling and calculations. Fourth generation hardware will make it possible to include on-line minicomputers with just about any laboratory equipment. The author reviews data input, programming, production of results, and on-line installation of mini-computers. The examples used to illustrate this new application include conformational analysis, investigation of primary structures and predictions of secondary structures for biopolymers, automation of chromatography procedures, applications in spectroscopic studies, kinetic experiments, and in the treatment of experimental data. Figure 1; references 32: 21 Russian, 11 Western.
[28-7813]

USSR UDC 575.313

CLONING OF RESTRICTASE AND METHYLASE EcoRII GENES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 247 No 5, 1979 pp 1269-1271 manuscript received 14 May 79

KOSYKH, V. G., BUR'YANOV, YA. I. and BAYEV, A. A., academician, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino, Moskovskaya Oblast'

[Abstract] Gene engineering methods make it possible to clone various genes in bacterial cells. Through amplification of DNA recombinant molecules and by means of the optimization of gene transcription, it is possible to get high yields of the cloned gene products. In this paper, data on the synthesis of a recombinant plasmid-carrying genes of the modification and restriction systems of EcoRII was reported. Amplification of this recombinant plasmid in the cells leads to the "gene dose" effect, that is, intensified synthesis of products controlled by the genes of the modification and restrictin systems of EcoRII. The clones thus obtained contain recombinant plasmids and may be used in synthesis of DNA-methylase and restrictoendonuclease of EcoRII, assuring a high yield of the desired product. Figure 1; references 3 (Russian).
[15-7813]

USSR

MEDICINES: SCREENINC OUT DOUBTFUL CANDIDATE AGENTS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Oct 79 p 4

PIPKO, D., Editor of the Scientific-Technical Information Section of source newspaper

[Abstract] This article is a full-page, popular composition on methods of screening new, potentially-effective drugs. The article is introduced by a reference to Soviet-American Cooperation wherein the cooperating physicians turned, with success, to the Scientific Research Institute for Biological Testing of Chemical Compounds (NII$_p$BIKhS), Ministry of the Medical Industry, for the guidance that Institute could give on the appropriate dosage for a particular antibiotic for an actual patient. A. A. Piruzyan, director of the NII$_p$BIKhS, points out that the USSR synthesizes about 40,000 new chemical substances every year--products ranging from floor coverings to motor fuel additives--and all must be tested at the Institute for their biological activity, i.e., for harmlessness and safety for man and his environment. For every 10,000 compounds, 3 or 4 qualify as new medicines. To get rid of the doubtful medical candidate compounds, screening methods are set up; computers are used as the first link to help the screening process. Likely candidates from the computer screening are referred to pharmacological and, also, toxicological winnowing out. Amount of dosage, duration of action, time of day when administration is most appropriate, personal idiosyncrasies must be resolved--on a clinical level, cooperative work is pursued with a Moscow hospital. NII$_p$BIKhS personnel participating in these endeavors include Dr. med. sci. E. A. Rudzit, Cand. chem. sci. L. Ye. Kholodov, Dr. med. sci. V. P. Yakovlev, Dr. chem. sci. A. Ye. Vasil'yev and Dr. chem. sci. Prof. Yu. Sh. Moshkovskiy. Cooperating scientists include Corresponding Member, USSR Academy of Sciences, N. A. Plate (of Moscow State University) and Corr. Memb. USSR AS, L. D. Bergel'son (head of a laboratory in the Institute of Bioorganic Chemistry, USSR AS--reference is made to the role of phospholipids of cell membranes and drug penetration). Areas of work specifically cited include anti-tumor agents, ferromagnetic fillers--to orient a drug to organ configuration, use of preparations to maintain health, adaptogens (Dr. med. sci. Ye. M. Kaplan) and the possible role of familiar drugs as adaptogens. A photo of the laboratory of pharmacokinetics of NII$_p$BIKhS and its staffers P. Zenin and I. Kadenatsi is included.
[44-8586]

USSR UDC 577.154

IMMOBILIZATION OF THE WHITE RAT LIVER MICROSOMAL FRACTION ON SILOCHROME

Kiev DOPOVIDI AKADEMII NAUK UKRAINSKOY RSR in Ukrainian No 8, 1979 pp 654-656 manuscript received 5 Mar 79

BOGATSKIY, A. V., SEVAST'YANOV, O. V., DAVIDENKO, T. I., YANISHPOL'SKIY, V. V., TERTYKH, V. A. and CHUYKO, A. A., Institute of Physical Chemistry, Ukr Academy of Sciences

[Abstract] Immobilized forms of white rat liver microsomal fraction were produced on silochrome with the use of 1,3,5-trichlorotriazine and the esterase activity and stability during storage was determined.

Hydrolysis of 3-acetoxy derivatives of 1.4-benzodiazepine-2-ones was performed with the use of the immobilized white rat liver microsomal fraction. References 9.
[46-2791]

2791
CSO: 1840

USSR UDC 616.833-002:612.014.46

ANTICHOLINESTERASE EFFECT OF PESTICIDES AS AN INDICATOR OF THEIR NEUROEMBRYOTOXIC EFFECT

Kiev DOPOVIDI AKADEMII NAUK UKRAINSKOY RSR in Ukrainian No 8, 1979 pp 650-654 manuscript received 5 Mar 79

BADAYEVA, L. N., All-Union Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics

[Abstract] Neurohistological and histochemical methods, electron microscopy and thin-layer chromatography were used to study the effect of chloroorganic pesticide polychlorocamphene (toxaphene) on the nervous structure of pregnant animals and their progeny. Daily administration of the substance and administration at critical times of development in 1/20 and 1/100 LD_{50} modified cytoplastic (non-synaptic) cholinesterase activity in heart and spinal cord neurocytes of the mother and fetus, produced ultrastructural disturbances of the myocardiocytes and myelin fibers and delayed differentiation of the nerve structure and innervated substrate in the post-natal period. The anticholinesterase effect of the pesticides indicates a state of intoxication or the inhibition of structural differentiation in prenatal and post-natal development or could indicate a neuroembryotoxic effect. References 15: 11 Russian, 4 Western.
[46-2791]

USSR UDC 611-018.2 + 541.6:61

MECHANISM OF BIODESTRUCTION OF POLYURETHANE IMPLANTS WITH VARIOUS STRUCTURES

Kiev DOPOVIDI AKADEMIYI NAUK UKRAYINS'KOYI RSR in Ukrainian No 9, Sep 79
pp 761-764 manuscript received 15 Feb 79

YATSENKO, V. P., LIPATOVA, T. E., TERESHCHENKO, T. L., ALEKSEYEVA, T. T., KOLOMIYTSEV, A. K. and NEUMERZHITSKIY, O. L., Institute of High Polymer Compounds, UkrSSR Academy of Sciences

[Abstract] Interference-polarization microscopy was used in the study of the biodestruction of polymers used for medical purposes. Two polyurethane polymers were investigated: a linear polymer from hexamethylene-diisocyanate (A-10) and a network polymer from polyethyleneglycoladipinate (A-9). Polymer film samples were implanted in rats and rabbits and examined with the surrounding tissue six months and one year later. After six months the tensile strength of these films dropped to 34 percent and 79 percent, and after a year down to zero and 42 percent of the original values, respectively. The destruction of these polymers was similar to hydrolytic destruction. Initially, microchannels were formed at the surface; eventually, fundamental changes throughout the polymer were observed. The linear polymer was destroyed much faster than the network polymer, because of the dense three dimensional structure of the latter. Figure 1; references 5: 4 Russian, 1 Western.
[32-7813]

USSR UDC 591.82 :576.3 : 578.085.93 :621.385.833

FINE STRUCTURE OF SPECIALIZED INTERCELLULAR CONTACTS IN L-CELL CULTURES TREATED WITH LOW LANTHANUM CONCENTRATIONS

Leningrad TSTIOLOGIYA in Russian Vol 21 No 8, Aug 79 pp 882-886 manuscript received 13 Nov 78

SNIGIREVSKAYA, YE. S., POTAPOVA, T. V., KOMISSARCHIK, YA. YU. AND CHAYLAKHYAN, L. M., Fine-Membrane-Structure Study Group, Institute of Cytology of the USSR Academy of Sciences, Leningrad, and the Interdepartmental Laboratory for Application of Mathematical Methods in Biology, Moscow University

[Abstract] L-cells from inter-muscular connective tissue that had been grown on cultures for 30 years were treated with lanthanum chloride, tested for intercellular metabolism, and examined by electron microscope. Control cells were also examined. Results indicated that the lanthanum treatment may serve as a modifier of membrane structure, since more gaps in junctions and fewer close bonds were noted when the L-cells were treated with the 1 mM lanthanum solution. Figure 1; references 8: 2 Russian, 6 English.

53-12131

USSR UDC 612.76

ACTIVITY AND ISOENZYME SPECTRUM OF LACTATE DEHYDROGENASE AS A MODEL FOR STUDYING GLYCOLYTIC PROCESSES IN HYPOKINESIS COMBINED WITH HYPERCAPNIA

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian
Vol 55 No 7, Jul 79 pp 1051-1056 manuscript received 4 Nov 78

MAKAROV, V. L., VORONIN, V. A., ALTUKHOV, V. G. and MASLOV, N. B., Leningrad

[Abstract] Six healthy males 20-21 years of age were subjected to 3 tests of 20 days each. In the first test variant they were exposed to a 0.1% carbondioxide gas environment, plus pronounced hypokinesia. In the second varient they were under the same condition as they performed; a set physical task; in the third they performed the task, in a 0.3% concentration of CO_2 in the air they breathed. Results showed that in the first variant under hypokinesis and hypercapnia the general activity of lactate dehydrogenase increased and the isoenzyme spectrum shifted in the direction of activization of M-isoenzymes and suppression of N-isoenzymes, indicating anaerobic glycolysis. Physical activity tended to bring the isoenzyme balance back toward normal. References 20: 15 Russian, 1 Slovak, 4 Western.
[54-12131]

USSR UDC 612.172.08

CONTINUOUS PROLONGED RECORDING OF HEART BEATS BY A NON-CONTACT METHOD

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian
Vol 55 No 7, Jul 79 pp 1079-1082 manuscript received 4 Nov 78

BELICH, A. I., The Comparative Sleep Laboratory, Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad

[Abstract] A method for measuring heart beat impulses by variations produced by animals in the electrical field potential in water was tested by placing electrodes on the sides of an aquarium wherein the experimental animal is to be placed. Two pairs of carbon electrodes were placed in vertical planes at right angles. An amplitude corrector was added to make it possible to observe the heart rhythm of an animal in the aquarium in any position. Figures 3; references 5: 3 Russian, 2 English.

54-12131

USSR

IDENTIFICATION OF THE CIRCULATION SYSTEM

Kiev AVTOMATIKA in Russian No 1, 1979 pp 17-24 manuscript received 25 Sep 78

LISHCHUK, V. A. and STOLYAR, V. L., Institute of Cardiovascular Surgery imeni A. N. Bakulev, USSR Academy of Medical Sciences

[Abstract] The problem of creating a mathematical model of the circulatory system which can be adapted to the specific system of each individual patient, rather than modeling the mean statistical characteristics of the circulation system, is discussed. The system uses a two-stage method for estimation of the parameters of mathematical models of an individual's circulation system, in the form of a group of applied programs, which has been studied on the monitor-computer system of the Cardiovascular Surgery Institute since 1966. Dynamic identification allows significantly more complete evaluation of the conditions of patients with severe cardiovascular disorders than ordinary statistical methods. Further studies are required to answer the questions of identification error as a function of the accuracy of representation of the processes in the model, the amount of detail in the description of individual circulatory subsystems, the influence of the central nervous system, etc. Figures 2; references 16: 10 Russian, 6 Western.
[13-6508]

USSR UDC 612.014.461.2

EFFECT OF EXPOSING HUMANS TO A NITROGEN-OXYGEN ENVIRONMENT AT 5-12 kg/cm^2 ON INDICES OF HIGHER NERVOUS ACTIVITY

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 25 No 5, Sep/Oct 79 pp 576-584 manuscript received 10 Jul 78

GYLYAR, S. A., MOISEYENKO, YE. V., SIROTA, S. S., GRINYEVICH, V. A. and SKUDIN, V. K., Division of Hypoxic States, Institute of Physiology imeni A. A. Bogomolets, UkrSSR Academy of Sciences

[Abstract] Physiological limits for saturation immersion in nitrogen-oxygen atmosphere have not been accurately established. This study evaluated the effect of an increased partial pressure of nitrogen in subnarcotic concentrations on higher nervous activity of human subjects. In addition, the role of preliminary adaptation to partial pressure of nitrogen was

studied, using total saturation at 5 kg/cm^2 pressure and increased threshold of narcotic action. The results showed that a moderately increased pressure of oxygen had no effect on the mental processes of human subjects; a decrease of mental activity was noted at O_2 pressures exceeding 266 mm Hg, and at elevated temperatures and humidity. This decrease became progressively worse even with preliminary adaptation upon exposure to simulated "depth" pressures in a compressed air environment. The greatest changes in mental activity were observed in subjects not adapted to high nitrogen pressure. Some of the symptoms included reduced acceptance and processing of information, lower storage levels, weakening of the bones, and poorer sensomotor reactions. Figure 1; references 28: 20 Russian, 8 Western.
[31-7813]

USSR UDC 612.17 + 616.12.092

INVESTIGATION OF THE CORRELATION OF CONTACTILITY OF THE ATRIUM AND VENTRICLE. FEASIBILITY OF THE USE OF INFORMATION ON ATRIAL CONTRACTION IN REGULATING AN ARTIFICIAL HEART

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 87 No 6, Jun 79 pp 515-518 manuscript received 26 Jul 78

SHUMAKOV, V. I., SHTENGOL'D, YE. SH., SHEVELEV, V. M., IZAKOV, V. YA., KUVAYEV, A. YE., RUTKEVICH, S. M., ITKIN, G. P. and SHEPELENKO, A. N., Institute of Organ and Tissue Transplantation, USSR Ministry of Health; Laboratory of the Biophysics of the Myocardium, Interoblast Cardiosurgical Center, Sverdlovsk

[Abstract] In experiments on dogs, the feasibility of using data on atrial contraction to regulate an artificial ventricle was evaluated. The relationship between the tension of the atrial wall and ventricle tension and pressure was studied by randomly varying the heart rhythm between 2 and 4 s^{-1} by means of a specially designed stimulator. The wall tension was measured by means of arched tensiometers, and the intraventricular pressure, by means of an electromanometer. A close relationship was found for the isometric contractility of atrium and ventricles: $\bar{R}(0) = 0.92 \pm 0.03$, and for the atrial wall tension and intraventricular pressure. On the basis of the recorded data, a conclusion was reached that this close correlation between atrial contractility and hemodynamic activity of ventricles could be used in the development of control parameters for an artificial heart. Figures 2; references 6 (Russian).
[36-7813]

USSR UDC 612.27

DYNAMICS OF CERTAIN INDICES OF THE ENZYME AND HORMONAL STATUS OF THE BODY AFTER HYPERBARIA AND IN DECOMPRESSION ILLNESS

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 65 No 7, Jul 79 pp 1033-1039 manuscript received 5 Jul 78

SAPOV, I. A., MYASNIKOV, A. P. and VINNICHUK, N. N., Leningrad

[Abstract] Investigations were intended to determine the impact of increased air pressure on adrenalin, noradrenalin, and 17-oxycorticosteroid, enzymes such as amylase, lipase, catalase, acetylcholine and cholinesterase, and their reactions to various levels of decompression illness. Mature cats were subjected to 8 kg/cm^2 air pressure over increasing periods, and then various methods were employed to determine parameters of hormone and enzyme dynamics. Results indicated three periods: a latent period after high pressure with increases in hormones, enzymes, and blood glucose, along with larger quantities of erythrocytes and hemoglobin; this was followed by the compression illness stage accompanied by even higher hormone levels, but reduced enzyme indices. Glucose, erythrocyte and hemoglobin levels continued to increase and all changes are related to hypoxia and hypercapnia. Finally, a period of return to normal parameters was noted after from 7 to 10 days, depending on the degree of decompression illness. References 19: 15 Russian, 4 English.
[54-12131]

USSR UDC 612.833.81

SURVEY ARTICLE ON CELL AND MOLECULAR MECHANISMS OF ADAPTABLE MEMORY FIXATION

Moscow USPEKHI FIZIOLOGICHESKIKH NAUK in Russian No 4, 1979 pp 3-22

KRYLOV, O. A., Central Institute of Health Resort Science and Physiotherapy, USSR Ministry of Health, Moscow

[Abstract] Mechanisms of long-term memory fixation are examined from the viewpoint of the network and molecular hypotheses. The network hypothesis stipulates that protein necessary for triggering the synapse formulates the coding net. According to the hypothesis of molecular coding, protein or its precursors, nucleic acids, are necessary as a substrate, coding separate elements of memory by means of alternating nucleotides or amino acids. The development of these theories is reviewed. Long-term memory is shown to be

a specific function of the nerve cell genome, possessing a wide spectrum of codons, available for synthesis of nucleic acids and protein on the matrix of unique DNA. Evidence is presented to show that macroneurons--pyramid cells, Purkinje cells, motoneurons--possess high dynamicity of function, while in microneurons (appearing after birth) there is stabilization of function--the fixation of long-term memory. The ability of microneurons (partly granular) to retain stimuli and their similarity to embryonic cells of later stages of development indicate that these neurons are able to change their metabolism and produce specific protein, corresponding to the character of adaptive reactions. Figures 7; references 80: 39 Russian, 41 Western.
[62-12152]

USSR UDC 616.858-008.6-085.616.831.47-085.844

EFFECTS OF ELECTROSTIMULATION AND DESTRUCTION OF THE MEDIAN CENTER OF THE THALAMUS IN PERSONS WITH AKINETIC FORMS OF PARKINSONISM

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII in Russian No 9, 1979 pp 1341-1346 manuscript received 13 Nov 79

VASIN, N. YA., MAYORCHIK, V. YE. and SAFRONOV, V. A., USSR Academy of Medical Sciences Institute of Neurosurgery imeni N. N. Burdenko, USSR Academy of Sciences Institute of Problems of Information Dissemination, Moscow

[Abstract] An attempt to explain the effectiveness of destruction of the median center of the thalamus in therapy of Parkinsonism and to confirm some functional features of the median center of the thalamus by results of electrostimulation during stereotaxic operations made use of 22 stereotaxic operations, involving 15 persons with Parkinsonism with pronounced akinesis and 7 persons with intractable pain. The study indicated that electrostimulation of the median center of the thalamus caused a reaction of general activation or inhibition in the emotional, psychic, motor, somatosensory and vegetosensory spheres but produced no significant effect upon tremor and bilateral cortical reactions in the form of "bursts" of synchronous slow vibrations. Destruction of the median center caused a definite reduction of the rigid component of tonus. Unilateral destruction of the median center in patients with 2d and 3d stages of Parkinsonism had a positive therapeutic effect in the form of general motor activation. Figures 4; references 15: 7 Russian, 8 Western.
[65-2791]

Plant Biochemistry

USSR UDC 574.963.3

SURVEY ARTICLE ON GENE ENGINEERING IN PLANT BREEDING

Kiev TSITOLOGIYA I GENETIKA in Russian No 5, 1979 pp 411-420 manuscript received 5 Jun 78

SIVOLAP, YU. M., All-Union Institute of Selection and Genetics, Odessa

[Abstract] Production of inter-species hybrids with broad genetic bases, despite the difficulties presented by natural protection of species purity, has led to numerous attempts at asexual gene engineering. DNA molecules that bear hereditary traits have been identified and used as chemically pure molecules, and cellular and subcellular systems have been utilized. The survey of efforts in gene engineering is divided into experiments at the level of individual organism, the use of cultures of plant cells, vector utilization, and possible directions for further research, such as improving amino acid content and culture of anthers of the first hybrid generation. References 35: 2 Russian, 33 Western.
[12131/1840-55]

55-12131

USSR UDC 632.3'4:[633.11+633.14

NATURE OF PINK COLORATION OF RYE AND WHEAT GRAIN AND WHEAT GRAIN

Moscow INZVESTIYA TIMIRYAZEVSKOY SEL'SKOKHOZYAYSTVENNOY AKADEMII in Russian No 5, 1979 pp 111-119 manuscript received 18 Jun 79

POPKOVA, K. V., SHNEYDER, YU. I. and ILYUKHINA, M. K., Department of Phytopathology, Timiryazev Agricultural Academy; Laboratory of Phytopathology, VNIIZR [All-Union Scientific Research Institute for Plant Protection?]

[Abstract] Results of a study of the nature of pink coloration of wheat and rye seeds included seeds received at the Timiryazev Academy Department of Phytopathology in 1976-1978 (19 samples of winter rye and 6 samples of winter and spring wheat) and at the All-Union Scientific Research Institute (40 samples of rye) were presented. Rose or raspberry coloration of the grain and violet coloration of the stem of winter rye and wheat arose from different biogenic and abiogenic factors, with coloration of the grain and stem caused by both saprophytic and pathogenic bacteria under certain conditions favorable for development of microflora on the plant. Some cases of rose coloration were caused by toxic species of the Fusaria family. Identified bacteria isolated from colored wheat and rye grains included Xanthomonas, Basillus, Pectobacterium and Erminia, which include both saprophytic and pathogenic strains. A definite connection was established between the degree of virulence of phytopathogenic bacteria and seed coloration and the amount of colored grain increased with an increase of degree of virulence of the strain. No connection was established between the pink coloration of the grain and the violet coloration of the stem, with the possibility of violet coloration arising from factors of the external environment which activates the phytogenic bacteria. References 18: 16 Russian, 2 Western.
[506-2791]

USSR UDC 616.895.8 + 616.895.8-055.52]-07:616.714-073.75

X-RAY STUDY OF THE SKULL STRUCTURE OF SCHIZOPHRENIC PATIENTS AND THEIR PARENTS

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII in Russian No 7, 1979 pp 922-929 manuscript received 13 Mar 78

GALIMOV, I. KH., Department of Roentgenology, Kazan Institute for Advanced Training of Physicians, Department of Psychiatry, Kazan Medical Institute imeni S. V. Kurashov

[Abstract] A systematic anthropological analysis was made of X-ray data of the skulls of 431 schizophrenic patients ranging in age from 15 to 34 years, including both chronic and intermittently afflicted types. A control group of 617 non-schizophrenic persons who had been X-rayed pursuant to head traumas was also studied. Specific abnormalities in skull formation for the schizophrenic patients and their parents, and the degree of abnormalities, indicate a statistically significant variation from the normal population. References 19: 13 Russian, 6 Western.
[49-12131]

USSR UDC 616.831-005-036.8:301

SOCIAL SEQUELAE OF CEREBRAL STROKE

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII in Russian No 9, 1979 pp 1288-1295 manuscript received 4 Apr 79

SHMIDT, YE. V. and MAKINSKIY, T. A., Scientific Research Institute of Neurology, USSR Academy of Medical Sciences

[Abstract] Social after-effects of cerebral stroke were evaluated from data of epidemiology registry materials covering 1972-1975 showing morbidity, mortality and lethality among persons in the work force (men from 16-59 years of age and women from 16-54) and among older persons (men 60 years of age or more and women 55 years of age or more). Motor and speech disturbances, capacity to walk, ability to return to work, to do household tasks and to perform personal care and other impairments were examined. Physical impairments (paresis and paralyses) remained in 42.5% of the patients who survived the stroke for 1 year; 38.2% required help in personal care while 20.2% of those in the work force returned to work and 17.1% returned to housekeeping. Higher mortality, lethality and morbidity were found in the older group, while more serious after-effects arose from ischemic stroke. References 14: 3 Russian, 11 Western.
[65-2791]

USSR UDC 547.963.3:612.014.44

ROLE OF SYSTEMS OF DARK REPAIR OF DNA IN DETERMINATION OF BACTERIAL AND PHAGE SENSITIVITY TO UV IRRADIATION IN THE ECOLOGICAL WAVELENGTH RANGE

Leningrad TSTIOLOGIYA in Russian Vol 21 No 7, Jul 79 pp 816-823 manuscript received 17 May 78

YANOVSKA, E., SAMOYLOVA, K. A. and VIZDALOVA, M., Laboratory of Phage Biophysics, Institute of Biophysics, Czechoslovak Academy of Sciences, Brno and Laboratory of Biochemical Cytology and Cytochemistry, Institute of Cytology, USSR Academy of Sciences, Leningrad

[Abstract] This study was aimed at answering some of the following questions: to what extent is the damage caused by the near wavelength UV (NWL) component of the sun's radiation repairable at cellular level?; is the low effectiveness of the dark repair (DR) system due to irreversible damage of DNA, or to the inactivation of the repair enzymes?; how effective is the repair of LWL irradiated phages?; how damaging is middle wavelength radiation? Twelve strains of *Escherichia coli* and two strains of *Bacillus subtilis*, differing in their dark repair capabilities of DNA, were used in the study. The most resistant cells to all UV radiation were the H/r30 strain cells with an active DR system for DNA; the most sensitive were the cells of the NG30 strain with a defect in the rec gene. In the cells irradiated by far and MWL UV, the DR mechanisms controled by uvrA, uvrB, polA, recA, lon and lexA genes were very effective; they were less effective in cells irradiated by NWL UV. This may be due to irreparable DNA damage occurring during UV irradiation. Figures 3; references 33: 11 Russian, 1 Czech, 21 Western.
[21-7813]

USSR UDC 576.312.3 : 591.436.2 : 591.169 : 591.044.82

NUCLEAR PORE DENSITY IN RAT LIVER CELLS DURING REGENERATION AND TOTAL X-RAY IRRADIATION

Leningrad TSITOLOGIYA in Russian Vol 21 No 8, Aug 79 pp 875-881 manuscript received 6 Jun 78

KUZ'MINA, S. N., TROITSKAYA, L. P., MIRKHAMIDOVA, P. A., BUL'DYAYEVA, T. V., ZBARSKIY, I. B. and GRIGOR'YEV, V. B., Laboratory of Biochemistry of the Institute of Developmental Biology, USSR Academy of Sciences, Moscow, and the Laboratory of Electron Microscopy, Institute of Virology, USSR Academy of Medical Sciences, Moscow

[Abstract] Male Wistar rats weighing 100-150 grams were tested for nuclear pore density in the nuclear envelope, at rest and 18-20 hours after the liver had undergone partial hepatectomy; the period corresponded to the beginning of DNA synthesis in hepatocytes of a regenerating liver. Nuclei were isolated and the number of nuclear pores counted by a freezing and etching procedure. Three preparations were taken from intact livers and 5 from regenerating livers, including non-irradiated livers and livers subjected to 1200 roentgens. Results showed that there was a decrease in nuclear pores in irradiated liver tissue per surface unit 1 hour after X-ray irradiation, in direct relation to the dose, and accompanied by degradation and breakdown in pore complex structure. Pore complexes seem to be formed within nuclei and to be inserted into nuclear envelope membranes in the course of development. Figure 1; references 24: 7 Russian, 17 Western.

53-12131

USSR

MAKARCHENKO, ALEKSANDR FEDOROVICH

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian Vol 25 No 5, Sep/Oct 79 p 616

[Obituary]

[Abstract] A. F. Makarchenko died on 5 Jul, '79. He was a prominent scientist in the area of neurology and neurophysiology, an organizer of Soviet medical science and public health, and an academician of the Ukrainian SSR Academy of Sciences. A. F. Makarchenko was born in 1903 in Zhdanov. He studied in the Khar'kov Medical Institute and, upon completion of studies, began working in the Ministry of Health. During World War II he served as the Deputy Minister of Health in Tadzhik SSR and as head of the Public Health Sector of the Ukrainian Communist Party. His early studies concerned the effect of the cerebral cortex on the chemical composition of blood and nitrogen metabolism. In 1954 he defended his doctorate thesis on the effect of manganese on human and animal nervous systems. In 1953 he was appointed Chairman of the newly organized Department of Clinical and Experimental Neurology (in the Institute of Physiology imeni Bogomolets, UkrSSR As), heading it for 25 years. He was director of the Institute from 1956 to 1966. He published extensively during these creative years, earning scientific and political recognition.
[31-7813]

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